Government
Publications

SESSIONAL PAPERS

VOLUME XL.—PART VI.

Fourth Session of Eleventh Legislature

OF THE

PROVINCE OF ONTARIO

SESSION 1908

TORONTO:
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1908.

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LIST OF SESSIONAL PAPERS.

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Agricultural and Experimental Union, Report	15	"
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Bee-Keepers' Association, Report	20	*Printed.*
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Bridges on Spanish and Sauble Rivers	69	*Not printed.*
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Gaols, Prisons, and Reformatories, Report	42	"

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Public Works, Report	6	"
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Railway and Municipal Board, Report	9	*Printed.*
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Secretary and Registrar, Report	40	*Printed.*
Spanish and Sauble Rivers, Bridges over	69	*Not printed.*

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No. 2. . Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature, 6th February, 1908. *Not printed.* Estimates for the year 1908. Presented to the Legislature, 6th March, 1908. *Printed.* Estimates (Supplementary). for the year 1908. Presented to the Legislature, 6th April, 1908. *Printed.*

No. 3. . Report of the Minister of Lands, Forests and Mines of the Province for the year 1907. Presented to the Legislature 1st April, 1908. *Printed.*

No. 4 . Report of the Bureau of Mines for the year 1907. Presented to the Legislature, 1st April, 1908. *Printed.*

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No. 5. . Report of the Commissioners for the Queen Victoria Niagara Falls Park, for the year 1907. Presented to the Legislature, 21st February, 1908.

No. 6. . Report of the Minister of Public Works for the year 1907. Presented to the Legislature, 9th March, 1908. *Printed.*

No. 7. . Report of the Registrar General relating to the Registration of Births, Marriages and Deaths for the year 1906. Presented to the Legislature, 9th March, 1908. *Printed.*

No. 8. . Report of the Temiskaming and Northern Ontario Railway Commission for the year 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

No. 9. . Report of the Ontario Railway and Municipal Board for the year 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

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No. 11. . Loan Corporations, Statements, being Financial Statements made by Building Societies, Loan and other Companies, for the year 1907 Presented to the Legislature, 9th March, 1908. *Printed.*

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No. 14. . Report of the Ontario Agricultural College and Experimental Farm, for the year 1907. Presented to the Legislature, 20th March, 1908. *Printed.*

No. 15. . Report of the Ontario Agricultural and Experimental Union of the Province, for the year 1907. Presented to the Legislature, 20th March, 1908. *Printed.*

No. 16. . Report of the Fruit Growers' Associations of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 17. . Report of the Fruit Experimental Stations of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 18. . Report of the Vegetable Growers' Association for the year 1907. Presented to the Legislature, 31st March, 1908. *Printed.*

No. 19. . Report of the Entomological Society, for the year 1907. Presented to the Legislature, 3rd March, 1908. *Printed.*

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No. 20. . Report of the Bee-Keepers' Association of the Province, for the year 1907. Presented to the Legislature 2nd April, 1908. *Printed.*

No. 21. . Report of the Dairymen's Associations of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 22. . Report of the Live Stock Associations of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 23. . Report of the Poultry Institute of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 24. . Report of Women's Institutes of the Province, for the year 1907. Presented to the Legislature, 23rd March, 1908. *Printed.*

No. 25. . Report of the Farmers' Institutes of the Province, for the year 1907. Presented to the Legislature, 23rd March, 1908. *Printed.*

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No. 26. . Report of Agricultural Societies of the Province (Fairs and Exhibitions), for the year 1907. Presented to the Legislature, 23rd March, 1908. *Printed.*

No. 27. . Reports of the Horticultural Societies of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No, 28. . Report of the Bureau of Industries of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 29. . Report of the Inspectors of Factories for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 30. . Report of the Bureau of Labour for the year 1907. Presented to the Legislature, 20th March, 1908. *Printed.*

No. 31. . Report on Highway Improvement for the year 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

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No. 32. . Report of the Ontario Game and Fisheries Commission, for the year 1907. Presented to the Legislature, 18th March, 1908. *Printed.*

No. 33. . Report on the Women's Institutes of the Province for the year 1907. Presented to the Legislature, 23rd March, 1908. *Printed for Distribution only.*

No. 34. . Report upon the Archives of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 35. . Report of Work relating to Neglected and Dependent Children of Ontario, for the year 1907. Presented to the Legislature, 16th March, 1908. *Printed.*

No. 36. . Report of the Provincial Board of Health, for the year 1907. Presented to the Legislature, 9th March, 1908. *Printed.*

No. 37. . Report of the Inspector of Division Courts, for the year 1907. Presented to the Legislature, 20th March, 1908. *Printed.*

No. 38.. Report of the Inspector of Legal Offices, for the year 1907. Presented to the Legislature, 12th March, 1908. *Printed.*

No. 39.. Report of the Inspector of Registry Offices, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 40.. Report of the Secretary and Registrar of the Province, for the year 1907. Presented to the Legislature, 2nd April, 1908. *Printed.*

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No. 41.. Report upon the Hospitals for the Insane, Idiotic and Epileptic, of the Province, for the year ending 30th September, 1907. Presented to the Legislature, 31st March, 1908. *Printed.*

No. 42.. Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1907. Presented to the Legislature, 31st March, 1908. *Printed.*

No. 43.. Report upon the Hospitals, Refuges and Charities of the Province for the year ending 30th September, 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

No. 44.. Report upon the Operation of Liquor License Acts, for the year 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

No 45.. Report of the Provincial Municipal Auditor, for the year 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

No. 46.. Supplementary Return from the Records of the several Elections in the Electoral Divisions of West York, Dufferin and Brockville, since the General Elections on January 25th, 1905, shewing: (1) The number of Votes Polled for each Candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of votes polled in each District; (4) The number of votes remaining unpolled; (5) The number of names on the Voters' Lists in each District. Presented to the Legislature, 6th February, 1908 *Printed.*

No. 47.. Report upon the state of the Library. Presented to the Legislature, 6th February, 1908. *Not printed.*

No. 48.. Report of the Hydro-Electric Power Commission of the Province, on the Cost of Power for the year 1907. Presented to the Legislature, 20th March, 1908. *Printed.*

No. 49.. Report upon Prison Labour. Presented to the Legislature, 5th February, 1908. *Printed.*

No. 50.. The Arbitration on the Unsettled Accounts, between the Dominion of Canada and the Provinces of Ontario and Quebec Presented to the Legislature, 21st February, 1908. *Printed.*

No. 51. . Statement of Receipts and Disbursements of the Temiskaming and Northern Ontario Railway, on account of construction, for the year 1907. Presented to the Legislature, 21st February, 1908. *Printed.*

No. 52. . Report of the Commission on the Methods employed in the caring for and treating the Insane. Presented to the Legislature, 20th March, 1908. *Printed.*

No. 53. . Copies of Orders-in-Council and Regulations of the Department of Education. Presented to the Legislature, 11th February, 1908. *Not printed.*

No. 54. . Rules and Regulations under the Succession Duties Act, being 7 Edw. VII., cap. 10. Presented to the Legislature, 19th February, 1908. *Printed for distribution only.*

No. 55. . Copies of Orders in Council fixing fees payable to Surrogate Judges of County of Middlesex; amounts payable to Judges McTavish and Gunn out of the Surrogate Court fees, County of Carleton, and authorizing payment of surplus Surrogate fees, County of Grey, to His Honour, Judge Widdifield. Presented to the Legislature, 21st February, 1908. *Not printed.*

No. 56. . Return to an Order of the House of the Twenty-first day of February instant; for a Return, shewing list of Fair Associations to which expert Judges were sent by the Department of Agriculture during the past two years; the names of the Judges with copies of reports made to the Department from each local exhibition board. Presented to the Legislature, 25th February, 1908. Mr. *May. Not printed.*

No. 57. . Return to an Order of the House of the twenty-eighth day of February, for a Return, shewing—1. The Government call for tenders for the supply of flour required at the different Institutions of the Province for the year 1908. 2. How many tenders were received. 3. The names and addresses of the persons or firms tendering and the price *per* barrel of each tender delivered at the various Institutions. 4. To whom the tender was awarded. 5. The estimated quantity required at each Institution. Presented to the Legislature, 28th February, 1908. Mr. *McCoig. Not printed.*

No. 58. . Return to an Order of the House of the twenty-fourth day of February, 1908, for a Return, shewing—1 What are the estimated quantities of each class of work done to January 31st, 1908, on the Government Railway by McRae, McNeil & Chandler under their contract with the Temiskaming and N. O. Railway Commission. 2. What sums, with date of payment, have been paid to McRae, McNeil & Co., or their assigns, for such work. 3. Has the Government taken the work out of the hands of the contractors. 4. What security, if any, has the Government for the due performance of the contract by the said firm. Presented to the Legislature, 2nd March, 1908. Mr. *Smith (Sault Ste. Marie.) Not printed.*

No. 59.. Return to an Order of the House of the second day of March, 1908, for a Return, shewing—1. How many cases have been tried by both Drainage Referees since their appointment. 2. What expense was there in connection therewith over and above the Referee's Salary. Presented to the Legislature, 9th March, 1908. Mr. *McMillan*. *Not printed.*

No. 60.. Return to an Order of the House of the seventh day of February, 1907, for a Return, shewing— 1. The number of Division Courts in the Province. 2. How many Division Court Clerks have resigned between the 7th February, 1905, and 1st February, 1907. 3. How many Division Court Clerks have been removed from office between the said dates. The names of such persons and the cause of removal. 4. How many Division Court Bailiffs have resigned between the 7th day of February, 1905, and the 1st day of February, 1907. 5. How many Division Court Bailiffs have been removed from office between said dates. The names of such persons and the cause of removal. Presented to the Legislature, 9th March, 1908. Mr. *Munro*. *Not printed.*

No. 61 . Return to an Order of the House of the ninth day of March, 1908, for a Return shewing—1. What Municipal Corporations applied to the Hydro-Electric Power Commission, under 6 Edw. VII., Chap. 15, Sect. 6, for the transmission of electric power or energy, with the respective dates of such applications. 2. Did the Commission give to each of the said corporations a statement of the terms and conditions upon which such electric power or energy would be transmitted and supplied by the Commission, together with a form of contract to be entered into between each of the said corporations and the Commission. 3. Did the Commission furnish to each of the said corporations any estimate of the cost of constructing, erecting, installing, and maintaining of buildings, works, plant, machinery, poles, wires, etc., necessary for transmitting and supplying to each said corporation the amount of power applied for. 4. If so, give names of corporations and amount of each respective estimate. 5. Names of municipalities in each of which a By-law was submitted under Section 7 of said Act. 6. Names of municipalities where such By-law received the assent of the electors. 7. Has any contract been finally entered into between the Commission and any such municipal corporation for the supply of electric power or energy by the Commission to such municipality. 8. (*a*) The names of municipal corporations, if any, that made application to the Commission under 7 Edw. VII., Chap. 19, Section 12, with the respective dates of such applications. (*b*) The maximum price *per* H. P. at point of delivery to Commission, quoted by Commission to each of said municipalities. 9. Between what Municipal Councils, if any, and the Commission was any provisional contract entered into as provided for by said Section 12, prior to the submitting of the By-law to the Electors by any such Municipal Council. 10 Has any such contract been finally executed under the provisions of Section 13 of said last mentioned Act. 11. Was any estimate given by the Commission to the several municipal corporations in accordance with the requirements of said Section 12, shewing

(*a*) The total cost of constructing and maintaining a transmission line or lines. (*b*) The proportion or amount of said total cost to be charged to and paid for by each municipality. 12 If so, the names of such municipalities and the amounts of such total cost to be charged to each of the said municipalities. 13. Were such estimates and provisional contracts published with the By-law, in accordance with the provisions of said section 12. Presented to the Legislature, 9th March, 1908. Mr. *MacKay*. *Not printed.*

No. 62.. Report upon the Feeble-minded in Ontario, with Census. Presented to the Legislature, 2nd April, 1908. *Printed.*

No. 63.. Return to an Order of the House of the third day of March, 1908, for a Return, of copies of all correspondence relating to the removal of what is known as the Wisa Wasa dam in Chisholm township in the District of Nipissing. Presented to the Legislature, 10th March, 1908. Mr. *Smith* (*Sault Ste. Marie*). *Not printed.*

No. 64.. Statement of distribution of Statutes, Revised and Sessional, for the year 1907. Presented to the Legislature, 10th March, 1908. *Not printed.*

No. 65.. Return to an Order of the House of the twenty-fourth day of February, 1908, for a Return, shewing—1. Any estimate made, prior to the doing of the work, of the cost of clearing along the sides of the right of way of the Temiskaming and N. O. Railway, through the Temagami Forest Reserve. 2. If so, by whom was such estimate made and what the amount thereof. 3. What has been the actual cost of this work to date. 4. What is the estimate, if any, of the annual cost of maintaining the clearing in such a way as to make it useful in preventing the spread of fire. Presented to the Legislature, 10th March, 1908. Mr. *Smith* (*Sault Ste. Marie.*) *Not printed.*

No. 66.. Return to an Order of the House of the fifth day of March 1908, for a Return, shewing what timber located on the right of way of the Temiskaming and N. O. Railway has been put up for sale during the last two years, by tender or otherwise, by the Temiskaming and N. O. Railway Commission. Also, what prices have been obtained and the time and manner of payment; the names of the purchasers and copies of the tenders sent in by them, and also copies of all tenders received in the case of each berth sold. Presented to the Legislature, 17th March, 1908. Mr. *May*. *Not printed.*

No. 67.. Return to an Order of the House of the twenty-sixth day of February, 1908, for a Return, shewing the quantities of timber cut under license in the Township of Freeman by Arthur Hill, or any assignee, or assignees, of the license formerly held by the said Hill in the said Township; shewing in each year the person, or persons, who scaled logs on behalf of the Government on said limit, and in each year the quantity scaled by each of the said Government scalers, if more than one employed. Also, the names of the persons and quantities of logs in each year scaled by the

Culler or Cullers of the said Arthur Hill, or any assignee of the said license of the said Hill, also, shewing the assignee, or assignees, of the said Hill. Presented to the Legislature, 17th March, 1908. Mr. *Duff*. *Not printed.*

No. 68.. Return to an Order of the House of the thirteenth day of March, 1908, for a Return, shewing the amount expended on Colonization Roads in the District of Manitoulin, during the years 1902, 1903, 1904, 1905, 1906 and 1907, respectively. Presented to the Legislature, 18th March, 1908. Mr. *Smith (Sault Ste. Marie.)* *Not printed.*

No. 69.. Return to an Order of the House of the thirteenth day of March, 1908, for a Return, shewing the number of Bridges built, by the present Government, on the Spanish and Sauble Rivers, shewing where the Bridges cross the rivers and the appropriation made for each. Presented to the Legislature, 18th March, 1908. Mr. *Smith (Sault Ste. Marie)*. *Not printed.*

No. 70.. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-first day of February, 1908, praying that he will cause to be laid before this House, a Return, shewing the several Commissions, both special or permanent, issued by the present Government; the object or purpose of each Commission; the cost to the Province of each, up to the end of the year 1907, together with the names, in each case, of the several Commissioners. Presented to the Legislature, 23rd March, 1908. Mr. *May*. *Not printed*

No. 71.. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-fourth day of February, 1908, praying that he will cause to be laid before this House, a Return, shewing the several Commissions of all descriptions issued during the years 1902, 1903 and 1904, the purpose of each Commission, the cost to the Province, together with the names of the several Commissioners in each case. Presented to the Legislature, 23rd March, 1908. Mr. *Preston (Lanark.)* *Not printed.*

No. 72.. Return to an Order of the House of the 21st day of February, 1908, for a Return, shewing: 1. The amount of losses caused by fire, in the Province, during the years 1900 to 1907, both inclusive—as reported to the Department of Insurance. 2. The amount of such losses reported to have been caused by incendiarism. 3. The amount of such losses caused by lightning. Presented to the Legislature, 24th March, 1908. Mr. *Munro*. *Not printed.*

No. 73 . A Return to an Order of the House of the twenty-sixth day of February, 1908, for a Return, shewing—1. How many civil servants have been dismissed since advent of present Government. 2. How many have resigned. 3. How many vacancies created by any other cause. 4. How many appointments to the Civil Service have been made during said period. 5. What was the number of civil servants in the employ of the Government on

December 31st, 1904. 6. What is the present number. Presented to the Legislature, 2nd April, 1908. Mr. *Ross. Not printed.*

No. 74. . A Return to an Address to His Honour the Lieutenant-Governor, of the fifth day of March, 1908, praying that he will cause to be laid before this House, a Return, of copies of all correspondence with the Government, or any member thereof, relating to the removal of Thomas Woodyatt from the office of Police Magistrate of the City of Brantford, also, copy of Report of Commissioner appointed to investigate certain charges preferred against said Woodyatt, and statement of aggregate cost of said Commission. Presented to the Legislature, 2nd April, 1908. Mr. *Preston (Brant.) Not printed.*

No. 75. . Return to an Order of the House of the eighteenth day of March, 1908, for a Return shewing: 1. How many persons have received permanent professional certificates under authority of either Sections 2, 3, or 4, of Chapter 52 of the Statutes of Ontario, passed in 1907. 2. Their names. 3. Under which Section they have qualified, and 4. How many persons have notified the Minister of Education, in writing, of their intention to comply with the provisions of either Section 6, or Section 7, of Chapter 52 of the Statutes of Ontario, passed in 1907. 5. What were the names and addresses of those who applied under each Section. Presented to the Legislature, 2nd April, 1908. Mr. *McElroy. Not printed*

No. 76. . Handbook of the Province. Presented to the Legislature, 2nd April, 1908. *Printed for distribution only.*

No. 77. . Return to an Address to His Honour the Lieutenant-Governor, of the ninth day of March, 1906, praying that he will cause to be laid before this House, a Return of copies of all papers and correspondence regarding the settlement of the Indian Claim of Northern Ontario, known as Treaty No. 9, together with a copy of the Treaty as finally agreed upon. Presented to the Legislature, 6th April, 1906. Mr. *Ross. Printed.*

No. 78. . Return to an Order of the House of the twenty-first day of February, 1908, for a Return, shewing a classified statement of annual payments of all kinds made by the Province to the University of Toronto and the School of Practical Science, for salaries, erection of buildings, maintenance, or for any other purpose whatever, for and during the period of the past six years. Presented to the Legislature, 10th April, 1908. Mr. *Hislop. Printed.*

ANNUAL REPORT

OF THE

Bee-Keepers' Association

OF THE

Province of Ontario

1907

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO

Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty

1908

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honourable SIR WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Ontario Bee-Keepers' Association for 1907.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1908.

Ontario Beekeepers' Association.

OFFICERS FOR 1908.

President	F. J. Miller	Ealing P. O., London.
1st Vice-President	Wm. Couse	Streetsville.
2nd Vice-President	M. B. Holmes	Athens.
Treasurer	Martin Emigh	Holbrook.
Secretary	P. W. Hodgetts	Parliament Buildings, Toronto.

Directors.

Division No.	1	W. J. Brown, L'Orignal.
"	2	A. A. Ferrier, Renfrew.
"	3	M. B. Holmes, Athens.
"	4	R. Lowey, Cherry Valley.
"	5	Jas. Storer, Lindsay.
"	6	Wm. Couse, Streetsville.
"	7	J. M. Switzer, Orangeville.
"	8	Jas. Armstrong, Cheapside.
"	9	W. J. Craig, Brantford.
"	10	D. Chalmers, Poole.
"	11	F. J. Miller, Ealing, London.
"	12	Denis Nolan, Newton Robinson.
Ontario Agricultural College		T. D. Jarvis, Guelph.
Auditor		John Newton, Thamesford.

Committees.

Executive: F. J. Miller, Ealing P. O.; Wm. Couse, Streetsville; M. B. Holmes, Athens.

Horticultural Exhibition: F. J. Miller, Ealing P. O.: Wm. Couse, Streetsville; M. B. Holmes, Athens; P. W. Hodgetts, Toronto.

Revising: H. G. Sibbald, Claude; P. W. Hodgetts, Toronto.

Honey Crop: H. G. Sibbald, Claude; Wm. Couse, Streetsville; J. Craig, Brantford.

Transportation: R. F. Holtermann, Brantford; Wm. Couse, Streetsville; J. D. Evans, Islington.

Representatives to Fair Boards.

London: F. A. Gemmell, London.

Toronto: E. Grainger, Deer Park.

Ottawa: W. J. Darling, Almonte.

Ontario Bee-keepers' Association.

The annual meeting of the Ontario Bee-keepers' Association was held in the County Council Chamber, Toronto, on Wednesday, Thursday, and Friday, November 13th, 14th, and 15th, 1907.

OPENING ADDRESS.

By F. J. Miller, Ealing.

As the most of you are aware, Mr. Smith, our President, who has been absent from the Province for some time, has found it impossible to be present and preside at this meeting, and as First Vice-President it is my duty to preside in his absence.

The past year has been filled with many worrying conditions for the bee-keeper. The winter and spring caused the greatest loss of bees known for many years; in some cases whole yards were wiped out. This was followed by a very light crop giving an aggregate of not more than one-third of the amount of honey produced two years ago. This has been the means of causing a sharp advance in the price, and thus the silver lining appears in the darkest hour. It now remains for bee-keepers to give a little more attention and thought to the food value of honey, so that we may at least for some time to come, reap a fair reward for our labor in supplying the most wholesome and nutritious sweet known to man.

But so many bee-keepers seem willing to place their standard of value too low, are so very self-sacrificing, always willing to accept the suggestion of a low price, and in great haste hurriedly start to sell for fear of being unable to dispose of their immense crop, of possibly, five hundred to two thousand pounds. As bee-keepers we must endeavor to lift such ones to a better understanding of their business. We have one of the grandest of pursuits, and it only requires that we study our line of work hard enough, and stick to it, and we will have success. Place your ideals high, and do not be satisfied short of success. If you do not take pleasure in your work and manage it on business lines, you are not apt to study it closely enough to do more than make a failure of it. Wake up! Become enthused! Raise your ideals to a higher standard. Hard study, with a strong determination in pleasurable work, brings success, and either make a success or get out of the business, and leave room for those who will. Possibly you may find your level in another calling more congenial to your make-up, and there find pleasure in your labor thus being benefited by the change.

I am pleased to say that the past year, working in conjunction with the Department of Agriculture, owing to the changes made a year ago, have been very gratifying and substantial, and from what I know I feel assured the Minister of Agriculture stands ready to continue this supply of ways and means to further our interests in bee-keeping, if we, as an Association will but work and open the way for its best use.

The new Inspectors have done good work in their various districts, several have been kept very busy coping with the disease of which we have been so constantly informed from year to year was so nearly eradicated, details of which will be laid before you.

In conclusion, I ask for your kind co-operation in successfully carrying out the programme and all business pertaining to this our annual convention.

Mr. Wm. Couse, Streetsville: I had not seen Mr. Miller's address before coming here, but I can say that the Association's work is being put on a better basis than ever before. A year ago I had some ideas as to how the work of the Association might be improved. I think perhaps we can truthfully say the work is in good hands and has been. We are in closer touch, as has just been mentioned, with the Department of Agriculture. They understand our position much better than they ever did. We are getting much more from them than we ever did before, and I think we will get more still. (Hear, hear). We have nothing to hide in connection with the work of the Association. Everything is put so that everybody may know what is being done. Our President has referred to the Minister of Agriculture. I can assure you that anything I have ever seen or heard him say has been to the effect that he was anxious to have our work done better. And he certainly is in sympathy with us. I think we ought to appreciate his efforts, and I believe we do. Personally I do.

When you speak of bee-keeping, which has been referred to this year as not being particularly profitable, still the crop has been, in some places very fair, and in some places very poor. It is a funny thing that a few years ago we all had an idea we ought to export honey. It is a fact this year that there is honey being brought in. Now, I have come to the conclusion that for some years we need not fear for a honey market. Our own people have learned to consume all the honey we can produce. I don't believe there is a better or cheaper article on the market to-day than honey. I believe our industry is in the best position it has ever been. Speaking from the experience, I have had in connection with honey, our honey is of a better quality to-day than ever. We have learned we must have good honey, and we are anxious to learn. All our preaching has been to produce a good article, and we are doing it. If you went to another land where they were in the habit of getting honey from another source you might find people who might not like ours so well, but, Canadian people like Canadian honey better than any other. I think the chances are very favorable for the bee-keeping industry, and it certainly is a profitable business if it is carried on in the proper way. It is profitable in more ways than one. It is perhaps egotistic to bring it up here just now, but it is not only the bee-keepers who are being benefitted; it is the whole public, and in more senses than one. There is the fact that they receive a good article for table use, and there is also the fact that we help in all the fruit growing and seed growing industries amongst the farmers. This last few years I have been buying clover seed right in a neighborhood where there are two or three bee-keepers, and it is marvellous the amount of seed that is coming from a few acres. It is a source of great wealth. I suppose if Mr. Sibbald were to get up and say anything at all with reference to the relation of honey to clover seed, he could say a lot. In his district it is marvellous the wealth that is coming out of it, and it is largely, no doubt, owing to the bee-keepers.

The Secretary, Mr. P. W. Hodgetts, read the minutes of the last annual meeting, which, on motion of Mr. Brown, seconded by Mr. Holtermann, were adopted as read.

DISTRIBUTION OF HONEY.

By W. A. Chrysler, Chatham.

In our commercial history there are evidences of economical mistakes constantly coming before our observation. To provide for at least a partial remedy for the evils and disadvantages that exist and other conditions that are arising in our own pursuit, it is necessary that we, as bee-keepers, take such steps as will put our business on an up-to-date commercial basis. Other industries are becoming more and more co-operative.

Co-operative buying and selling may eventually crowd the middleman to his proper position, and the greatest good to the greatest number should and may yet prevail. The difference between the unjust buying price and the unjust selling price is the tax that producers of wealth are paying to those who become millionaires without rendering just services. The products of the earth and that of industry are being produced for the enrichment of the few at the expense of the community.

In our own industry we have disagreeable features to overcome. We have the wily buyer who knows the market conditions. The producers of honey being so scattered over the Province cannot form an idea of the market values without information being given through reliable sources. Without reliable information, and the need of ready cash for his product he is induced to sell at the buyer's mercy. The honey buyer, buying honey in bulk, puts it in retail packages according to his own ideas. He may adulterate or improperly liquefy or otherwise deteriorate its quality in proportion to the knowledge he has of the business. In evidence of this it has been my privilege to take a trip through our North-west country about two months ago, and from my own observation I am of the opinion that the honey sent to that part of our country should be handled by the bee-keepers themselves, or their representative. I found the product of 1906 well distributed throughout the west yet unsold, and it was difficult to find any that had granulated. I tasted samples that I considered not pure honey. Some labels were worded in a manner that would deceive the public. The honey that had the names of Manitoba bee-keepers on their labels was a credit to themselves and their Province.

The bee-keepers who have retailed or caused their honey to be retailed in an up-to-date and proper manner have been a credit to the industry and have demonstrated to the world that our honey is unexcelled. It is therefore our opportunity now to assume control of our product that its reputation may stand unimpaired, that we further develop that market. Increase our output as we may, we can find a profitable market there if we do it in a proper manner reserving enough, of course, for home consumption.

An Association or Exchange, formed of bee-keepers and managed on lines similar to the Fruit Growers' or other Associations, that can place itself in a position to supply the trade in the North-west from the surplus that we may have is most desirable. We can then have uniformity of packages and prices, and better prices on the whole, and in many instances a less price to the consumer, and at the same time keeping the reputation of our honey where it belongs, and that is at the top.

For the home market, I would recommend the bee-keeper to keep as far as possible his home market supplied in retail packages, the surplus to be handled by the Association. Any district having a shortage would always have a source of supply should there be one attainable. By our united efforts we may form an Association with very little expense to ourselves that

will well repay us, encourage bee-keeping as an industry, supply the needs of our growing country, and increase its wealth and prosperity.

Mr. Brown, Chard: I am very glad to hear the remarks of the last speaker, as well as those of the one previous to him. They are both coming down to what I have advocated for years, that is, a home market first, last and every time. Secure a good market at home and cultivate it and you will have little difficulty in disposing of your surplus honey. This year there is very little difficulty in disposing of surplus honey.

Mr. Evans, Islington: It appears to me that we Canadians do not realize what a market we have at home for a great many of the commodities we produce. We are all the time on the look-out for a market in the States or somewhere else, and we forget that we are getting to be enormous consumers in this Canada of ours. We are a people who, in proportion to the population, buy and consume more than any other people on the face of the earth. Canadians buy heavily and live well. I think we have never had in the past, or will never have in the future, any more honey than we want in the Dominion. One of the things we want in Canada is the "All Red Line" for our home consumption, to get our commodities from one part to the other. I think if we can get our honey to those who actually want it we will never need to look at a foreign market. Another thing about honey is that it will keep for years; consequently, if there is a large surplus in one year we can always safely let it stand over, for the chances are that in a few years we are going to have a short crop. I like the idea of cultivating our own market. I have always adopted the habit among my neighbors of never having small packages. I have a neighbor not more than half a mile from me and he cannot sell a package more than five pounds. I never have anybody that wants anything less than ten pounds, and sometimes a hundred pounds. I would advise those cultivating the home market to always have a good, large package. Never keep a package less than ten pounds about the house, and I think you will sell a great deal more honey. I have a splendid market around my home. The only trouble is I can't get honey enough to supply it.

Mr. Holtermann, Brantford: The address which Mr. Chrysler gave us, and the key-note of which, to quite an extent, I think is co-operative selling, is one to which we may very well pay greater attention. I am thoroughly convinced that the right way for bee-keepers to sell their honey is to co-operate, and do that in every section where they possibly can. We might say the Ontario Bee-keepers' Association might do that work, but I am inclined to think that that is too large a field for them to cover alone, and that it would be better for the County Associations, or the smaller districts at least, to take that matter in hand. I have seen for some time that by a County or District Association having a label under which it would guarantee the purity and quality of its honey, a package so labelled would have the preference over the label of almost any individual.

There are things which we, in a measure, control and yet do not control. We can control the ripeness of our honey, but we cannot always control the quality of the article which we produce, particularly in poor seasons. So that I am strongly in favor of this co-operative work. We must remember, however, that those who undertake to sell in a co-operative way will find that they are not entirely able to cut out the expense of the middleman. There are bad debts, and insurance and such things which the co-operative body has to stand as well as the individual; and we must make up our minds that those who co-operate must be people of responsibility who will have to foot the bill if there is any to foot. I think Mr. Chrysler is on the right line in what he has given us.

Mr. Byer, Markham: I believe, with the last speaker, that co-operation is a splendid thing, but it will not come amongst bee-keepers until we have different seasons from the last two years. As long as we can get the prices which we can at the present time it will be hard to get bee-keepers to enter into any co-operative association. I believe we cannot cultivate the markets too much. Three or four years ago we were quite glad to think of an opening for exporting money, but we have been up against heavy winter losses, and there is not one-quarter the bees in the Province to-day that there were a few years ago. I am firmly convinced in my own mind if the number of bees in the Province next year is as numerous as they were seven or eight years ago, and we got two or three big crops, we would be glad to look for an export trade for our honey. We are independent now when the prices of honey are good; and those that have a fair crop say we need never look for any place to ship our honey. I am sadly mistaken if we do not look towards exporting some of our honey before many years. The home market can be cultivated, and in the North-west there is room for a lot of honey. At the present time the trade is in a very loose way there. Do not let us turn our eyes with a scornful look towards the English or any other market.

Mr. Holmes, Athens: Even though there be not any honey to be exported, I think it is quite within the right of this Association, and I think the idea should be seriously considered, too, of formulating some plan by which a co-operative scheme may be followed in the good years that are to come. I am in sympathy with the thoughts thrown out in the paper. And while working up our home market to its fullest extent, I like the thought dropped by my friend Mr. Evans, about having a fairly good sized package, so that when a customer comes after some honey he will take some home with him.

Mr. Couse: We might compare fruits with honey. I have been something over twenty odd years at Streetsville. When I first went there, there was very little fruit grown in what is termed the garden of Ontario between here and Hamilton; and now it is practically one large fruit farm. I know of one man who had 18,000 boxes of strawberries. I suppose twenty-five years ago you could hardly find that number all through there. Where do those berries go? Honey is just as good as berries, and better, because it will keep. There is a market for fruit and that market has been developed. I think there is just as much room for developing the honey market, and more, because honey is a thing that will not spoil, and you can ship it all over.

Mr. Holtermann: In various parts of the States they have what are called field days where demonstrations in handling bees and so on are given, and I have been told by bee-keepers there that as a result of drawing attention to bees and honey that way the demand for honey has increased very much.

Mr. Deadman: I think the remarks that have been made are to the point. I would like to ask Mr. Chrysler a question. He says that the honey in glasses or bottles of the 1906 production was still liquid. Do I understand him that it should not be that way? Is that any indication that it is adulterated?

Mr. Chrysler: I made the statement that it was not granulated. It would look strange to Ontario bee-keepers to see all the honey in our stores keep liquid for over a year. I should not say whether it was adulterated or not. I believe some which I did see in that state was adulterated, if I am a judge of honey.

Mr. Miller: I am sure the paper has brought out a very general discussion which I think will be profitable, and Mr. Chrysler should feel well

repaid for his study along these lines. Honey will keep and bear shipping, and the North-west will open up a market for an unlimited supply if we can place a choice article there; and I think it behooves bee-keepers to see that that is done, and not to wait until a season of plenty comes, and then push into that market. I think we should be prepared to send a little every year, and thus keep our market open. Our honey is selling here at a shilling, and there is no difficulty in getting that, and possibly a little more from our North-west customers. It has been done this year. In our local Association we have endeavored to make a little shipment this year, and we have received more than we were getting at home. If a certain percentage of our honey could be sent out of the country our home demand would be better, because people would find it more scarce. The fact of the matter is, bee-keepers are placing too low an estimate on their product. The public will not advance towards our own ideals; they will buy the cheap syrups. If honey remains cheap they do not think but what it may be adulterated the same as the syrups they are purchasing. But, if bee-keepers will place a choice article on the market and ask a fair price, this shipping out will give a stimulus, and the small bee-keeper will be compelled to ask a fair price. If his neighbor sells for a couple of cents more than he does, it will sharpen him up better than anything I know of. Bee-keepers in our neighborhood sold cheap, and they regretted it this year. Another year, they said, they would not be in such haste to dispose of their crop.

Mr. Lowey: This year my market was all at home, and I had no honey to spare. I have heard complaints about adulterated honey from the west. I hope every bee-keeper will keep in mind the question of adulteration.

Mr. Robinson: I am in sympathy with the idea of cultivating the home market. Four years ago I had a little honey to spare, and I went to the store-keepers and some of them refused to touch the honey at all; others said they would handle it for thirty per cent. Having a little leisure I thought I would go out in the neighborhood and see what I could do. I got rid of probably 2,500 pounds. Since then I have adopted that plan. This year my crop was short, but I disposed of over 2,000 pounds in about two days and a half. In one corner of our little town I could put my label on cans of honey and dispose of 4,000 pounds, but I have come to the conclusion that not a pound of honey shall go through my hands but what is first-class. That is a point we should insist upon. Let us produce the very best article we can.

Mr. Heise: The absence of granulation in honey is not always an indication of its adulteration. I can show you a sample that has been taken off the hives five years ago in my home to-day without a particle of granulation in it.

Mr. McEvoy: Wasn't that dead ripe honey?

Mr. Heise: I am not prepared to answer the question, but it is just as it came out of the hive. The first winter it was exposed to the lowest temperature we had, in an open honey-house. After that it has been, possibly, in a temperature not nearly so low.

Mr. Dickenson: I would say that the supply and demand should regulate this question. It is not very long ago that we were looking to foreign countries for a market for our honey. Things have changed. Then we hear it said that there is not more than a quarter of the bees in the country to-day that there was some years ago. That would account quite a bit for the shortage of honey. You certainly can command a better price when there is not very much honey produced. I hope the time will come around when there will be a great many more bees and a great deal more honey.

We want to cultivate the taste for honey as a food. It is a splendid food it is a grand breakfast food; no sweet is healthier. It will not take long for our colonies to be numerous again if we have a good year or two.

Mr. HOLTERMANN: I would move that Mr. Chrysler, who has brought this subject before the Association at different times, and the executive of the Ontario Bee-keepers' Association, be a committee to take this matter in hand, and formulate something which they think would be workable, and that the result be sent by the Secretary to the local and county associations so that they could have it before them at their spring meetings.

Mr. BROWN: It is very difficult to lay down a hard and fast rule. The same rule which applies to grain will apply to honey. In the years that we will have a plentiful crop we will have to sell at a smaller price than in the year when we have a reduced crop.

Mr. CHRYSLER: I don't quite agree with what Mr. Brown has said. The honey industry is quite different from the grain industry. Bee-keepers are scattered from one end of the Province to the other, and we don't know what our neighbor is getting for honey or anything else; we are isolated. Some of us know that there is a difference of fifty per cent. in the prices realized by bee-keepers this year, and probably more. We, as bee-keepers, want to unionize and standardize our goods and label them with uniform labels, and place it so that a consumer in any part of our country can send to one spot and get it. I am not complaining myself, I believe I can get pretty near what my honey is worth. But there are others who cannot. I think we should all be willing to help the others in that respect. Anything that helps the industry helps the country, and when it helps the country it makes a wealthy country. We want a wealthy country; we are proud of it.

Mr. BROWN: Mr. Chrysler remarks that bee-keeping is an isolated branch of agriculture. I say no; it cannot be considered as such. We have an Association, and there are fifty other different Associations connected with agriculture, and if the other Associations can obtain good prices we can surely do the same. I think reports could be made at least every month and circulated through the *Canadian Bee Journal*. There should be competent correspondents in each part of the Province to report the conditions during the season, to show the prospects for the crop, so as to put every bee-keeper on the same footing.

Mr. STORER: As an example of the development of the market, I spent a good part of the summer in the old country, and I was around amongst the fruit growers, and in one place within a radius of three miles of a town of 3,000 people there were 12,000 acres of raspberries, where I don't suppose there was half an acre when I was there years before. I asked my friend there how they did with their marketing. He said: "We used to have a lot of trouble, but we have now got into the co-operative principle. Everyone is in the Society: we all bear a part of the expense, and we all get the same profit. All we have to do is to deliver our fruit in proper condition at the railway station, and we are through with it, and at the end of the year we get our accounts settled up."

Mr. EVANS: I think we already have an Exchange Committee who are supposed to be doing this work, and if they are not doing enough you can give them a few more instructions. Probably Mr. Sibbald could give us some information.

Mr. HOLTERMANN: My motion has nothing to do with that line of work. It is not to fix prices or collect statistics. The idea is to send to the County Associations a plan which seems feasible to them upon which they could co-operate in selling their product.

Mr. Byer: If the motion is carried, it appears to me the work of the Committee would be in vain. As long as there are high prices, I do not think the bee-keepers will be interested. I don't think we are ripe for it under present conditions.

Mr. Newton: I think this is the proper time. I don't seen any use in not building the barn until we have the crop ready to go in.

Mr. Hodgetts: It may be as Mr. Byer has said, that you are not quite ready for this work. The fruit growers were practically forced into it. It started in the western part of the Province, where the apple growers were either destroying their orchards altogether or sending their crop to the evaporator. The orchards were scattered; the men were not in touch with each other; they didn't know anything about prices. Now in Mr. Chrysler's own home a number of men got together, and decided to see what they could do. Instead of each man selling his own crop, they tried to get the products of their orchards hauled to some central point and disposed of. In fact, they were the pioneers in this co-operative work, there and at Burlington and St. Catharines. To show how strong this Chatham Association has become, about three weeks go, I went there to call on the manager, and found that the Friday previous their evaporator which they run in connection with the Association was destroyed by fire. This would have been quite a blow to any ordinary man or firm, but the Association was equal to the emergency, and when I arrived there that evaporator was half re-built. The loss was heavy, but the members came together and determined to re-build. They went to work and doubled the size of it. At St. Catharines they have become so strong that they have quite a large membership, and are ordering their packages all the way from British Columbia. They find they can get a better box package from there than they can here. The same way with spraying materials; their copper sulphate and sulphur they purchase by the carload.

Their main point is in marketing their fruit. The buyers in the western part of the Province were few in number. If there was a good crop they would never go near the small orchards. If there was a poor crop they would sometimes gather up the fruit and pay the man and sometimes they would not. Now, these farmers have got together. They take their fruit off the trees, loose-pack them in barrels, haul to some central point where they are re-packed—all of the products of all the orchards of the members—by one set of men. They can get a carload of Spys or other varieties as they desire. Previous to that no one or two men could supply a car of that kind. They could supply a car, but it would be made up of perhaps 15 or 20 varieties of fruit. Now they can pick out 75 per cent. of the Spys and put them into those cars, and get the same price for the balance as they could for the Spys. Another point. They have a central organization here in Toronto. Their expenses are very light. They have a Secretary here who gets out weekly letters, when the crop is moving, stating what Associations have sold, what prices have been offered, whether there are buyers from certain points and so on. Supposing a man comes from the Old Country for apples, the Secretary will direct him to some of those Associations, and those Associations are written to: and this year you will be surprised at the uniformity of prices. There is no Association in the organization that does not know what other Associations are getting. In that way they are kept closely in touch, whereas previously they didn't know anything about it until a Government report told them what prices had been accepted in certain sections.

It may be that the bee-keeping industry is so different from the fruit growing industry, that this co-operative work cannot be extended in the same

way, but I certainly do not think it would do any harm to have a searching enquiry made, to see whether anything can be done for this industry.

Mr. MILLER put the motion, which was seconded by Mr. Robinson, and, on a vote having been taken, it was declared carried.

QUESTION DRAWER.

HONEY PRICES.

Q.—How would it do to depend upon the judgment of the Honey Crop Committee for prices?

Mr. LOWEY: I am very much pleased with the work of the Honey Crop Committee, although I think they are a little late in getting out their statements. I think it has helped a good many.

Mr. STORER: I think the Honey Crop Committee did a good work. I think if it was put out for the white clover honey first, and a later advice for the dark honey, it would be a very great advantage.

Mr. NEWTON: I have a request that has come from the Oxford Bee-keepers Association, and, as a delegate, I think this might be the best place to bring the matter up, so with your permission I will read the resolutions there passed:

> Moved by J. B. Hall, and seconded by William Beuglass: "That the thanks of the members of the Oxford Bee-keepers' Association be tendered to the members of the Honey Crop Committee for the good work they have given the bee-keepers of our country in the past; but we would request that the report be given a little earlier in the season if possible; and also that we as a Society would like to have a copy of the same placed in the hands of the secretaries of the local societies for all the members."

Mr. TIMBERS: What good is that report if secured on guess work? I think we must wait till the crop is pretty well harvested.

Mr. HOLTERMANN: There is a difficulty there that is hard to overcome. It is just the last part of the crop that counts so much. Take Oxford and Essex and through there, the basswood flow is over before it begins in the east. When we touch this question we want to consider all these things. In the future it is even necessary to consider what the Quebec honey crop is like. You have to contend with that; there is quite a little bit of that honey shipped in here; and if they had had a good crop this year we would have had more to contend with.

Mr. COUSE: You can't get this crop report out very much earlier. Even now the reports come in with an estimate of what it may be. A good many people have not their honey off when the report comes. Last summer Mr. Craig sent out circulars asking questions as to the crop all over the Province, and asking the directors as to their idea, and those reports were very useful and gave a fair idea of what was going on; and, of course, any *Bee Journal* is glad to do the same thing. If the officers in the different districts can report each month you can have a fair idea. It is really wonderful how accurate these reports are. The idea in asking for it a little earlier is that some men want to sell a little bit earlier.

Mr. NEWTON: I don't think it is that. There was always someone that was ready to buy, and they approached some of the bee-keepers, and those men do not know whether to sell or whether they are getting enough. It is not really that they want to sell, but they want an idea what they should get.

The thought I had was to bring the form to the other bee-keepers through the country. There is no other way of their receiving it.

Mr. COUSE: Through the *Bee Journal*. I don't believe you can get this report before the crop is in.

Mr. NEWTON: There are hundreds of people that don't take the *Bee Journal*. The report that went through the newspapers was a great help through the country. When you went to a business man he was ready for the question, and he knew you were going to ask more for your honey.

Mr. HOLTERMANN: Let the names of the members of the local Societies be sent to the Secretary of this Association, and he can send the report to all the members.

Mr. HODGETTS: This year, early in the season, the Department sent out circulars obtaining the names of all bee-keepers in the Province. I think we got in about 1,200. We then sent another circular to these names asking them certain questions in reference to their apiaries. I think we got about 300 answers in return, before the committee met, when I had gone over with Mr. Couse the matter of this circular. I sent that circular not only to all members of the Bee-Keepers Association but to all those in this list of 300 names that were not members, and I told them at the time if they would answer the questions in the crop report card I would send them the report; and we did so.

Mr. COUSE: The day that report was made out it was given to the press of the country, and it was all through the Province the next morning.

Mr. CHRYSLER: I think there is a remedy for not getting the report out earlier. Those who wish to sell early, those who wish to buy early, and those who wish to go by the prices arranged by the Crop Committee, can sell subject to those prices when they get them, if they intend to go by them at all, and the Honey Crop Committee is representative of the Bee-Keepers.

Mr. HOLTERMANN: You won't get very many people to buy on those terms. If the price has been high the previous fall I try to contract for my crop as early as possible the next season, because I want to take advantage of the high prices and ideas of the previous season. If they have been low I am not in a hurry.

Mr. BYER: I think we are quite safe in leaving it to the discretion of the Committee; I think they will send them out as soon as they can. I wish to endorse what has been said about the good work done by the committee.

Mr. ROBINSON: Could not this report be sent out according to locality? In the basswood season in my section there was very little honey, and it was on towards the latter part of July before you would see a bee touching it. In the more southern part of the Province they have it a great deal earlier. If this report could be sent according to locality I think that would remedy the matter to some extent.

The CHAIRMAN: I have had it in mind to ask the committee to try to arrange for these reports earlier. As far as our Ontario members are concerned those reports are early enough, but it is not they who affect the market; they have to suffer by those who sacrifice. The minor man will sell before we are ready, and when you go to the storekeeper, and ask him a certain price he will say, "You are away up;" and you can't raise that price until the other fellow has sold out. In the West, if we could get those reports the last few days of July, it would make an infinite difference to us. I spoke to one or two of our local members who had sold, and I said, "Didn't you get the report?" They said, "Well, it came, but I had sold." That set the price.

This committee is doing grand work, and I think the local Associations as well as the Ontario members should stand by them and be prepared to hold up

the prices they quote. The report that was given in the newspapers did a great deal of good. The merchants were all prepared for an advance in price, but when they could buy it for less, they wouldn't give the price. It is not necessary to wait till the honey is off the hive to give an estimate.

Mr. Byer: We were waiting for more to come.

Mr. Holtermann: The only thing to be done is to recommend that the bee-keepers wait for that report before they sell.

Re-Queening Colonies.

Q.—What do you regard as the very best time in which to re-queen your colonies?

Mr. Byer: If you have any buckwheat, during the buckwheat flow.

Mr. McEvoy: As early in the season as you can.

Mr. Timbers: As soon as you take the white honey off, if your queen is a failure, re-queen then, and during the buckwheat honey flow your queen has a chance to build the colony up good and strong for winter quarters.

Mr. Chrysler: It is rather difficult to rear good queens after the honey flow is over.

Mr. McEvoy: You are right. I don't like these little runts of queens.

Mr. Holtermann: There are different opinions about annual re-queening or at what time to do that. I must confess that I have not been re-queening annually. I found it a very great expense and trouble. I have always felt in doubt as to whether I was pursuing the right policy or not, and that is, whenever I noticed a queen showing signs of failing, to replace her. In the *Bee-Keepers' Review* an article appeared by R. L. Taylor, who went pretty thoroughly into that matter. He showed that it costs so much to find these queens, and then you had to destroy them. It cost so much to rear or replace these queens by purchase; and after you get through, you then have, as a rule, quite a percentage of queens which are inferior. After I read that article I felt pretty well satisfied that, everything considered, the policy with which I had previously not been altogether satisfied, was after all the better policy for me. My answer to that question would be to re-queen whenever you see signs of failure. One valuable feature of the fall flow is that the bees are much more apt to supersede then than at any other time of the year.

Mr. McEvoy: I like to re-queen early in the season, at the honey flow, when they build their cells and raise their larvæ. About ninety per cent. of the queens should be wiped out for better ones. I have had as many as seventeen queens at home caged at a time in the swarming time before I would put back any of them. After they would come out they were clipped and caged and I gave them a little honey so that they could feed themselves. If I found a queen was not suitable I would kill that queen and tear all the cells out. I would raise queens from another colony, where the brood seemed to be all capped, as it were, in one day—not a skip. Among these that skip, you will get some good queens, but as a rule they are a poor class. I would kill these, be they young or old, that are doing irregular work. You will find colonies that are good feeders of larvæ; other again are miserable feeders, and I would kill their queens. I am in favor of re-queening more. I read that article by Mr. Taylor. He is a good comb honey producer. There is more superseding with comb honey than extracted. Instead of running for nine or ten frames of brood, run for twenty or twenty-two. A queen can only lay so many thousand eggs in her lifetime. That queen won't do the work the third summer because you have pretty well used her up. Another thing, queens do not cost anything as a rule. If you buy a young queen and intro-

duce her in the summer, that queen goes into the fall with young bees, comes out in the spring better, builds up faster, and gives you more honey, so that she does not in reality cost you anything. I am an out-and-out advocate of young queens. I don't want to leave it to the bees to regulate the thing. That is a case of the bees managing the man instead of the man managing the bees. We are not paying close enough attention in breeding. If I buy queens I like to buy them from a good queen breeder, who will raise them from colonies that give the most honey. I think bee-keepers should raise more queens than they do. It is easy to do away with a queen if she is in fault and introduce another one. For a preference among bees give me, after all, the Italians.

Mr. ARMSTRONG: I think the proper time is any time that you find she is failing, no matter what time in the season it is.

Mr. DICKENSON: I would recommend bee-keepers to re-queen every two years. I wouldn't wait till she commenced to play out. I try to have nuclei with laying queens, and to raise queens during the honey flow. I keep track of the age of my queens, and I certainly raise queens from my best stocks.

Mr. TIMBERS: I would test that queen in the nucleus for a while before I would kill one queen in a colony to give a new one to it. If she don't turn out satisfactory when she commences to lay, I nip her head off.

Mr. DICKENSON: When I was intrdoucing my queen, I would certainly have some idea whether she was a good queen or not.

Mr. BYER: Your plan is to kill all the queens at two years, good, bad, or indifferent?

Mr. DICKENSON: I don't think I put it that strongly. If you have a special queen that you know is superior to anything you ever had in the yard there is no harm in keeping that queen for four years.

Mr. TIMBERS: If you see a queen, when she first starts to lay, dodge one egg here and there, cut her head off.

Mr. MCEVOY: How do you raise your queens?

Mr. TIMBERS: I cut out the best cells and I have little cages of my own make, and when I see a good cell I slip it in. It is charged with candy, and when she hatches she is there when I want her. As soon as I use one out of a nucleus I put another in.

Mr. LOWEY: I want a queen to be hatched out as early as possible. I would rather have a fifteen than a seventeen day queen, and I want her laying as soon as possible, and if she lays as many eggs at four year old as she did at one I won't take her head off.

Mr. TIMBERS: I have introduced virgin queens, and I didn't find it made a penny's worth of difference whether it was ten days old or one day.

Mr. HOLMES: The consensus of opinion seems to be to re-queen as often as you notice a queen going on the fail—at no special time during the summer.

POINTS OF A GOOD CELL.

Q.—What are the points of a good cell, or how will we know when it is good?

Mr. MCEVOY: A large cell with an immense quantity of royal jelly.

Mr. TIMBERS: How are you going to see the royal jelly?

Mr. MCEVOY: You take a pen-knife and cut into one cell and you will find that it is nearly one-third full of royal jelly; cut into another and you will find there is just barely enough to last that queen through. Now, that is going to be a little runt. You will find I am right.

Mr. BYER: In nine cases out of ten I find that the cells from which the queen hatched, will have royal jelly in.

Hershisher Wax Extractors.

Q.—Did the Ontario Government buy Hershisher Wax Extractors, and if so, what became of them? Why is there no report as to their use?

Mr. McEvoy: After a long delay I got one into the country, and then I left it, and it stayed quite a while before it came to me. It was broken and I went to the expense lately of fixing it up. I have it at home.

Mr. Evans: I understand the Ontario Government bought one of these, and it was to be loaned around to the members to test it to get a report, to see if it was better than what we have got to-day. Has anybody tested it?

Mr. McEvoy: Yes, I tested it, and other parties tested it. I don't like to throw cold water on the machine. It will take more wax out of the slumgum than any other; but will it pay—that is the question? It is a good machine, but, after all, I will take the Gemmell press; I think that fills the bill all right.

Mr. Byer: What about the quality of the wax from the Hershisher press?

Mr. McEvoy: When you are extracting the last dregs you don't get as fine a quality, and you have got to use sulphuric acid. I have tried them all, and I have never found anything that equals the Gemmell press.

Mr. Evans: I don't see the object of the Ontario Government buying one of those presses if we are not going to know the precise results. I expected there would be some report on the slumgum left, over the Gemmell press.

Mr. McEvoy: Fourteen pounds on the hundred, but you have got to work for that.

Mr. Holterman: What kind of slumgum?

Mr. McEvoy: What is put through the other press.

Mr. Couse: How long would it take you to get that fourteen pounds? A day?

Mr. McEvoy: No, but you have got to use the acid.

Mr. Gemmell: I am very glad this matter has been brought up. I have never claimed that the press I have used has taken all the wax out of the slumgum. Some years ago I was quite satisfied that the old steam process was not getting it all, and I rigged up this press, and I took some of the slumgum from those steam presses and I found it paid me. Mr. Newton will tell you that at one time I got twenty pounds of slumgum from him that had gone through the Jones steam press and out of that I got seven pounds and three ounces of wax. I want to say that Mr. Hershisher has been very fair and honest. Over in Chicago, in speaking of wax presses, he gave me due credit for what I had done, and I thank him for it; but he said he was getting up a better press. Unless a man has a large number of colonies and intends to use a press extensively I don't think it would pay him to pay eighteen or twenty dollars for a press when he can get the other one for about four dollars. However, either press, unless it is used properly, will not accomplish the end in view. I can take one hundred pounds of slumgum out with my own press, and I will guarantee you will not get fourteen pounds of wax out of that after I use the press the way I do it myself.

Mr. Holtermann: I would like to ask whether the object of getting that wax press was to test its value, or for the purpose of sending around amongst those who had wax to render? I understood it was the latter.

Mr. McEvoy: I thought in getting it I was getting something better.

Mr. Newton: How many have tried it, and how long has it been in the country?

Mr. McEvoy: Mr. Taylor and myself have tried it. A year ago last August it arrived in the country, but it didn't get into use until last winter.

Mr. Holtermann: I have tried the Root, the Hatch-Gemmell, and the Hershisher, and as Mr. Gemmell says, it is a matter of how you use the press. You can do good and bad work or bad and worse with different presses. The advantage I see about the Hershisher wax press is that you can work it in cold weather. You are working everything under hot water, and it won't cool on you the same as with other presses.

Mr. Evans: I can't see why the Government are going to buy a wax press at all unless we are going to get some information. I am thoroughly satisfied with the Gemmell press. I made 400 pounds of wax this summer. I believe there is a great deal in the process of making the wax. I don't agree with my friend Byer in his article in the *Canadian Bee Journal* about only boiling the slumgum a few minutes. I think you want to boil it thoroughly. I have a Gemmell press and I think all the wax that will come out of that after we get through will not be worth having.

Mr. Byer: I didn't write in regard to slumgum, but in regard to wax in the first process.

Mr. McEvoy: No wax should ever be boiled; just bring it to that point.

Mr. Holtermann: I quite agree with Mr. Byer. In rendering wax don't boil it one minute longer after it is thoroughly melted. As soon as the wax is melted there is no object in going on; in fact it is a positive detriment.

Mr. Evans: Mr. Sibbald has a press, and I would like if he would give a description of it.

Mr. Sibbald: My press is a Gemmell press made over. Anybody who has a Gemmell press could incorporate my ideas and make one that would be quite an improvement on it. I think from what I have read of the Hershisher press that it will be handier than his, and would get every bit as much wax out of his and would take very much less boiling. There is one feature about the Hershisher press. He puts the combs in, pounding them into a hard cake, and puts that on to the stove to boil, and the objection these genetlemen have to boiling wax would obtain there, because the outside would boil before the inside would ever get melted.

Mr. Holtermann: It is not necessary to treat it that way.

Mr. Byer: Will slumgum lose the wax that is in it?

Mr. McEvoy: Yes, it will lose; it will spoil.

Mr. Newton: I hardly agree with Mr. McEvoy. I sent some to Mr. Gemmell which had been lying outside, and he got the result which he gave you.

Mr. Chrysler: My experience with wax is, it will not decay, but the burr or cocoons that settle around it will decay in such a manner that you cannot get it back.

Mr. McEvoy: I didn't mean the wax; I meant the slumgum.

Packages for Retailing Honey.

Q. What sized package will I put honey up in to retail?

Mr. Timbers: Whatever size the customer wants I should say.

Mr. Evans: Nothing less than a ten pound package.

Mr. Chrysler: From experience I have found we need it all the way from half pounds up. A grocer needs an assortment to meet the requirements of his trade. I find the grocer as a general thing does not push the larger package as he should.

Mr. Evans: I certainly would not be bothered with half pound packages. If the storekeeper wants to sell those packages I say to him, "You can buy the glass cheaper than I can; buy the honey wholesale and fill them yourself."

ADDRESS OF WELCOME.

By J. D. Evans, Islington.

I am very happy to be able to welcome you on behalf of the great County Council of York. You are holding your sessions in our Council Chamber, and I know you will bring no discredit upon it. The caretaker said last year, after your meeting, it was the cleanest meeting ever held in this Chamber. I think it is quite a compliment, but it is exactly what I would expect from the bee-keepers. They are more than ordinarily an intelligent lot of people; their subjects and particular avocations necessarily imply that they are superior intellectually and morally to other people. I hope you will meet here in this hall for many years to come. I may not be able to welcome you as a County Councillor next year because I have decided to give up my official duties, as I have been here for a long time, and it is about time I was out, but I will be here with you anyway. There is no gathering I enjoy so much as the gathering of the bee-keepers. I have formed friendships among the bee-keepers that I consider among the best in my life. In looking around the hall I begin to think I am getting old. I am sorry my friend McKnight is not here to-day, because I think we were among the first members of this Association. I remember being a member when Mr. D. A. Jones was in full swing, when we had Mr. Corneil, Mr. Pettit, and a number of others whose names I have almost forgotten, and we used to enjoy sitting at their feet and learning words of wisdom. I am glad those who are here following them are their equals, if not their superiors, and in future I have no doubt this organization will succeed.

I am glad to know that this Association has been of great benefit to the bee-keepers of Ontario. I do not think they half appreciate what this organization has done. When I was President, we sent out circulars to 7,000 bee-keepers asking them all to join, and I was very much disappointed when I found we had only about 120 members. We had the Foul Brood Act passed years ago, and the Pure Honey Bill, and the Act to Prevent Spraying Trees when in bloom; and, last of all, we have had the Foul Brood Act amended, so that now we have half a dozen men trying to kill foul brood instead of one. I am satisfied that is going to be a great improvement. I would be very glad to see that number doubled, and a whole host of inspectors in every county.

Bee-keepers, after all, are somewhat like municipal men: They sometimes sting each other, and sometimes sting the other fellow, but they are generally after the honey; they have among their members workers; they also have drones. Unfortunately while the bees kill off the drones in the fall, sometimes the municipal drones are not killed off in the fall; they stand over till next year. I do not know exactly what we have in place of a queen; but they do say sometimes that the council is no better than an old woman. (Laughter.)

Now, as far as the bee-keepers themselves are concerned, I am very glad to welcome you, and hope you will enjoy yourselves and have a good time, and that we will all meet frequently in the years to come and renew the

friendships we have formed. This organization will become a great success and benefit to all the bee-keepers around, and the apiarists of the county of York will be always glad to welcome you in this old historic hall. (Applause.)

Mr. Miller made an appropriate reply on behalf of the Association.

A MODERATE USE OF THE EXTRACTOR IN KEEPING THE BROOD FRAMES FREE OF HONEY.

By E. W. Alexander, Delanson, N.Y.

Taking it for granted that your methods for securing a surplus of honey from your bees are similar to ours, I wish to call attention to the importance of a moderate use of the extractor in late spring and early summer in order to prepare the hive for a large well-filled brood nest. After our bees commence to gather nectar in the spring, old capped honey in the hive is a serious prevention to allowing the queen to spread her brood to the full capacity of the hive. We find it much to our advantage to feed a little warm, thin honey or sugar syrup daily at this season, and extract nearly all the capped honey from the hive during the month of May. This gives the queen a chance to fill it with brood, and as a result of this extracting we have strong full colonies, ready for the first of the clover harvest.

This is especially important in producing comb honey. We all know that if the bees have two or three inches of capped honey between their brood and supers they are rather slow in filling them, whereas, if the combs are full of brood from top to bottom and end to end, our chances are much better in securing a fine surplus.

The neglect of using the extractor, as I here suggest, has cost many honey producers one-half of their expected surplus. This is a bad loss through neglect, but it doesn't stop there. As the season advances, the brood nest continues to grow still smaller; consequently the working force is reduced in size, and they go into winter quarters with mostly old bees and then spring dwindling, and a general disappointment is the final result of allowing a cramped brood nest the previous summer.

Invariably the colonies that give us our large surplus are those that have a large, well filled brood nest during the entire season. Granting this to be a fact, it certainly will pay us well to see that the queen of the colony is not restricted for room in any way previous to our surplus harvest.

Another thing of special importance is to produce good honey of fine appearance. This will always sell readily at a fair price, and your customers will be anxious to engage your surplus long before it is ready for market. This matter of quality and appearance is of far more importance than many realize. We have always taken special pains to look after this part of our business, and as a result, we are now receiving orders for honey from nearly one-half of the States of the Union, and we frequently have more orders than we can fill. From what I have seen in the agricultural products of our cousins across the border, I am led to believe you have one of the finest, fertile sections of the world. Your stock, hay, butter, cheese, honey, oats and wheat are second to none. And may your honey ever be a twin sister to the best we in the States can produce.

I hope you are taking the best bee literature that is published, both in Canada and the States. This is one thing you cannot afford to be deprived

of. It is through those valuable journals that we acquire a knowledge of the latest improved methods that enable us to produce many times as much honey as formerly and receive a much better price. They are the fountain-heads from which emanate a thousand streams of useful knowledge. It was with pleasure that I read in one of our agricultural papers a short time ago of your crop of over 100,000,000 bushels of wheat, and some 200,000,000 bushels of other grain. Such results show perseverance and industry, to an extent that you become an honor to America. When you have large mining and manufacturing towns spring up in your rural districts, giving employment to thousands of your sons and daughters, as you some day will have, also making a fine home market for your produce, then with longing wishful eyes the sons of Europe will watch your comforts and progress.

To those who have taken up bee-keeping and the production of honey as a business, I extend my best wishes. I am well aware that you, in common with us, have many discouraging obstacles to overcome, but all lines of business have these, and ours is no exception. At such times we must put our shoulder to the load a little harder, economize a little more, and success will crown our efforts in the end.

It is usually a good plan to watch the methods of the successful bee-keeper, then incorporate his ideas with your experience, and the result will frequently be all that can be desired. I think that many honey producers make a big mistake in giving their colonies too much super room at one time. Their bees are never crowded as they should be, in order to secure the best results, and instead of having a number of well filled sections in the fall, and a small number of those partly filled, they frequently have a large number that are unsaleable at the end of the season, and comparatively a small number that are nicely filled for market. These results show at once that there is something wrong in the method that is practiced. I think it will pay us all well to look close to this part of our business, and strive to make the most we can from every colony whether we have few or many. It would be better for many of us if we cared less for the number of colonies we had and more to the net profits of each. It requires capital, experience and considerable labor to successfully care for several hundred colonies so that each will give us a nice surplus, and without a certain amount of surplus there is but little inducement to follow the business.

But we are fast overcoming the difficulties of the past. Every season brings forward improved methods, so we can reasonably expect better results in the future than we have had in the past.

I wish to thank each and all for the kindness that has ever prevailed among us, as honey producers, in freely giving to others the results of our experience, thereby extending a helping hand to our less fortunate brother. May this noble principle be a leading part of our business is my sincere hope.

Mr. MILLER: I am sure we are all pleased with the paper from this large producer, and I hope it may bring up discussion which may be profitable to the meeting.

Mr. McEVOY: I think it is one of the best papers ever read in this Association. The matter of keeping the brood chamber free is very important. It won't do to extract all, but I think Mr. Alexander has more reference to the outside. The bees can uncap the other. The larvæ at that period means everything. The paper, take it all in all, is business from start to finish.

Mr. HOLTERMANN: Do you mean you would prefer to uncap rather than extract?

Mr. McEvoy: What Mr. Alexander says is perfectly correct. I have done that for thirty years—extracted the outside combs of sealed honey; but in a brood nest you will sometimes find in the centre comb two or three inches of capped honey and brood, and if you extract that for the sake of getting off the rim of honey at the top you will remove the larvæ. After shaving the capping off, wipe it off. Any honey that is between the super and the brood is a damage, because the bees don't pass over that readily; and after it is removed the queen will go up and fill that with eggs close above and always on the top bar. The closer you can keep the brood to the super, the more honey. That will work just as well with the extracted as with the comb honey. He is speaking again of giving too much space in the sections there. You come out with a lot unfinished.

Mr. Robinson: What would you do with the honey that you would extract?

Mr. McEvoy: I would thin that, and feed it every other evening. I would work to consume the most of it. You can get more used up than you have any idea of. From that time on there is not enough coming in. There is a lot of larvæ that requires feeding. This last spring I never saw in my experience as much starved brood. The old bees died, and there wasn't enough nectar brought in after that, and there was starved brood in every hive I opened up. But that system will prevent one single starved larvæ. Last spring Mr. House, of New York State, was going to feed a quarter of a pound every evening; that is too little. It takes three-quarters of a pound daily during the slackness.

Mr. Laing: How much water would you add to the honey?

Mr. McEvoy: I don't know, but I would put some in if it was too thick.

Mr. Evans: I have two strong objections to that system. In the first place, you would waste a lot of young brood. In the second place, I wouldn't feed an ounce of honey under any circumstances. I do not think anybody is absolutely sure they haven't a taint of foul brood in the apiary.

Mr. McEvoy: I cannot quite agree with Mr. Evans on that point. I do not think Mr. Alexander would extract from combs containing brood. I think he had more reference to the solid combs of honey. The plan I mentioned would get over extracting the larvæ. I can uncap mine and feed all I like. I have not got a particle of taint in the yard, and have not had for thirty years or more.

Mr. Holtermann: As Mr. Evans has said, I think at the present time we should be very careful about not advocating too much the feeding back of honey. I do not think it is the right thing to do; but it is all right to feed syrup. I think the majority of brood chambers in Ontario are too bare of honey. I would not have any more in than what would be sure to carry them through a considerable spell of cold weather. I do not think ten pound in the brood chamber is too much.

Mr. Holmes: When a person is in trouble and desires legal advice I believe it is customary to seek out a lawyer. Now I believe it could be admitted that this man whose paper has been read to-night is a good authority on bee-keeping. May we not interpret that he has advocated in this paper that we watch with care that the brood nest be not over-clogged with honey, because he tells us to use the extractor? May we not get out of it, in brief, that he warns us to see that the queen be not crowded by the presence of too much honey in the brood nest? I think the advice is good. I think we may follow it safely, inasmuch as we recognize Mr. Alexander as a successful man and an authority on bee-keeping. Before dropping the

discussion, I think it would be well also to note with pleasure another thing he says, when he speaks of the country with such wonderful resources and such wonderful production, the hundred million bushels, and the Cobalts and all these things; and he speaks of all Europe looking with longing wistful eyes towards Canada. It is a very frank admission from Mr. Alexander. I think it is very pleasing, and we should regard it as such.

Mr. McEvoy: I would rather have some honey removed than to leave a brood nest clogged with old honey.

Mr. Dickenson: There is one important point in connection with the paper, and that is the feeding back. He pays particular attention to that. In my experience I consider that is a very important thing. I stimulate in a very bad spell of weather when the bees can't get out to work. It is no excuse for a man to neglect his bees. That is the time we should stimulate. If there is honey coming in, it is not necessary to follow that, but look out for the day following. If you start to stimulate you have got to use a great deal of judgment and keep it up. I am very much pleased with the paper; it is a good one.

Mr. Lowey: He speaks of early spring up to the clover flow. The hive that is very heavy and full of honey coming out of the cellar, set down and left alone up to the clover bloom is always the best and produces the most section or other honey. How many have had that experience, without any other disturbance, stimulating or other feeding?

Mr. Storer: That is my experience. With about forty pounds of honey in the hive I can set them out safely. Some of the members have said they would not, on any account, have more than twenty in the fall, and another twenty in the spring, but sometimes you can't feed in the spring.

Mr. Dickenson: I think you can feed anything without any detriment to the colony.

Mr. Holtermann: Beginning when?

Mr. Dickenson: When they need it.

Mr. Laing: Suppose they do not need anything at all?

Mr. Dickenson: I would not open up the hive until it is time to uncap. Let the colony alone.

Mr. Sibbald: I thought that was a very good paper, and Mr. McEvoy followed it along and showed the principle pretty well that I think leads to success, in getting your colony ready to super—that is getting it full of brood right to the top bar. That principle, I think, will bring success. The bees will go into the super and work there. But Mr. Alexander's conditions are a little different from ours. He keeps, I understand, about 700 colonies in one location. You would naturally suppose that they would not get as much spring stimulating of honey as ours would; but we keep 100 colonies or so in one locality, and we have lots of spring blossoms coming on from early spring until the fruit bloom, and our colonies do not need stimulating to the same extent as his colonies would.

This year I had an opportunity of visiting some yards where spring stimulation was practised and where spring letting alone was practised, and in every case I found that the colonies were in better shape that were let alone, and that had plenty of honey in the fall flow. In two yards where I visited, they practised spring stimulating, and they didn't have the bees. I don't know whether the bees had got lost in coming out when they should not, to get some of that honey out of the trough; but, at all events, I didn't see anything to induce me to practice spring stimulating. I have never practised it only when my colonies have been short of honey, and I have always thought that was a most unfortunate thing for me.

The extracting of brood combs is something that I don't like to do in the spring, and some here have objected to that. I overcome that to suit myself by crowding the bulged combs together. The tops of the combs are crowded together in the spring until they will touch, and the bees must cut up through that and make a space, thus they will empty those cells and the queen will lay in them. You can manage, in that way, to get your honey pretty well out of the top of the combs. You make your honey into brood, that is the idea.

In the fall of the year, when I feed up I usually take out one comb and spread the combs a little apart, and when they are fed up they bulge them little, and in the spring they will stand crowding together. That helps them a lot, and it does not disturb them to any extent.

Mr. McEvoy: I want to draw attention to a little thing Mr. Sibbald spoke of. He said bees that were fed this spring went back. As I understood him these were fed out-doors. That is a mistake, because they had to go out in unsuitable weather. But if you feed them in the hive it is all right. Do not mistake this point; Mr. Alexander speaks of the month of May. Feeding in the hive in the month of May, even if it be an unfavorable spring, will not result in much loss.

Mr. Dickenson: I do not think Mr. Sibbald should hand out to the bee-keepers of Ontario that it is not wise to stimulate, without telling us the methods he adopts. I do not think it is stimulating at all to put some syrup in a trough and expect the bees to go out in the cold weather and get it. I consider that is harmful. My personal method of stimulating is by the Mason feeder which works on the pepper box principle. If you do that, and you have your colony properly protected on top of the brood nest, it is a simple matter to have a small perforation in the blanket. Turn that up and tuck the cushions around nicely, and I will guarantee the stock is better for that kind of treatment.

Mr. Byer: You would not practice stimulating except after fruit bloom, as I understand it?

Mr. Dickenson: Unless there is danger of starvation. Then you must start in early. I would not make any hard and fast rule. I think stimulating is the best thing bee-keepers can do in the kind of springs we have had lately.

Mr. Holtermann: I believe that Mr. McEvoy and Mr. Dickenson are correct; but it is a matter of doing it in a correct way, and there is a very great danger in doing it in an improper way. As far as I am concerned, running out-apiaries, I cannot follow up stimulative feeding.

Mr. Dickenson: I say that the man who is keeping an out-apiary is in another class to that of bee-keepers keeping a home apiary, and he must speak from that standpoint.

Mr. Holtermann: I am an advocate of spring feeding done in the right way.

Mr. Laing: If you only had one yard would you practise spring feeding or not?

Mr. Sibbald: No; I would not feed a colony.

I want to answer Mr. Dickenson and explain about the yards I noticed, They were fed outside in a trough. When my bees have been short of stores, I have poured syrup into the combs and put it into the hive; but I have always regretted having to feed them. It is not stimulative feeding at all; it is feeding to prevent starvation, saving the lives of the bees. That is the only feeding I want in the spring.

Mr. HOLTERMANN: The point is, let the man who looks after them see that they have stores enough.

Mr. DICKENSON: I think the results ought to speak for themselves. I got 100 pounds to the colony. If you can get 100 pounds in a poor year like this, you can get 200 pounds in a good year.

Mr. MCEVOY: You can get one third more honey by attending to the stimulative feeding.

Mr. BYER: I think there is a misunderstanding about the time with reference to stimulative feeling. Mr. McEvoy has told me scores of times he would not practice stimulative feeding until after fruit bloom, while Mr. Alexander advocates it soon after the bees are set out of the cellar.

Mr. HOLMES: Would it not be as well to be exceedingly careful as to what we try to read out of Mr. Alexander's utterances? We have heard the advice; be careful, guard against having too much honey in the hive; and Mr. Byer quotes from where Mr. Alexander says to feed them early.

QUESTION DRAWER.

FEEDING BEES.

Q.—In our locality the honey crop was a total failure. We had to feed sugar to winter the bees. Would it have been profitable for next year to have fed enough sugar to have made them swarm and kept the queen laying all summer?

Mr. SIBBALD: I do not think it would pay. I think the cost of that swarm would be pretty high. The condition spoken of is an abnormal one. We generally get enough to stimulate brood rearing and carry the hive through the summer and fall even though we do not get surplus. May we not infer from the two sayings that Mr. Alexander wishes that one of the Alexander feeders, perhaps, be attached to every hive, and when unfavorable days come, and the bees are closed in, them give them a little bit of feed all round? I believe it would be a safe thing for every man to try.

CELLARING BEES.

Q.—What is the best time to put bees in the cellar?

Mr. LAING: I asked Mr. Smith that question by mail, and he replied about the 20th November, providing cold weather was setting in.

Mr. HOLMES: I consider in my locality, eight years out of ten, the first week in November. My bees are in the cellar now.

Mr. DICKENSON: I would say the first or second week in November. I like to see them get a fly in November and then put them in.

Mr. HOLMES: The main thought in connection with that first week in November is to get those bees out of the way of the first heavy frost, and not let them get a frost that would dampen the hive throughout.

Mr. EVANS: Does it make any difference if that cellar air was so dry that they would dry out in two or three days after they are put in the cellar?

Mr. DICKENSON: There would be no detriment in having a little snow, but frost is not desirable when you are putting them in, because when you are closing the entrances they are not so nice to handle.

Mr. STORER: I put my bees in from the 12th to the 20th November.

Mr. HOLTERMANN: I am like Mr. Holmes; I am getting to be more and more an advocate of early putting in. I learned my lesson from Mr. Mor-

rison of Kingston, who pointed out to me that outside bees suffered during cold nights; they became more or less distended and, as a rule were never as good for wintering.

Mr. Holmes: Replying to Mr. Evan's question, I would not venture to answer as to how much damage would really take place, but I would say that the man who loves his bees and goes out on a morning when the temperature is quite low, and hears the cry of his bees that are cold, must be moved by it a little; and he says to himself, "I will try to get you in before the heavy frost catches you next year."

Mr. Holtermann: It is not alone the bees that suffer, but in these cold nights the bees contract so that the stores deteriorate more or less. I found by putting them in later that there were more dead bees drawn out of the hives immediately after they were put in, than there were for a month after that in the cellar.

Buckwheat Honey and Dead Brood.

Q.—Have any of the bee-keepers who have wintered their bees on buck wheat honey found a good deal of dead brood in the early part of the season?

Mr. Lowey: I usually winter my bees on buckwheat, and I would ask for no better feed. I have very seldom found dead brood from any cause, but never from that. Sometimes we may mistake other honey or honey-dew for buckwheat honey. If the honey will stick it is all right. If it will drop off watery it is not pure buckwheat, and it may not be safe for wintering bees or wholesome for brood. My bees are in the cellar. They are all right. I think the bees should be dry and kept dry either underground or above ground. A person must judge of their own locality. As soon as you think the chances are not good for another fly you should put them in as soon as possible after the first of November.

Mr. McEvoy: The class of honey has nothing whatever to do with dead brood. That dead brood that was found in there was simply starved brood.

Mr. Switzer: Do you thin your buckwheat when you feed it back?

Mr. Lowey: I don't feed it back; the bees gather it.

Mr. Switzer: I have had a good deal of dead brood this summer, and I thought may be it was from feeding back buckwheat and boiling it—whether that destroyed the virtue of the honey or not?

Mr. Holtermann: It does. Dr. Phillips gave an address at Harrisburg upon that question, and he said if the temperature was raised above 160 degrees it so affected the honey that it no longer had the properties of honey. I do not think it is well to feed back buckwheat honey.

Mr. Holmes: I would venture to winter a stock of bees just as soon on good buckwheat honey as any other kind.

Taking Pollen out of Comb.

Q.—Does it pay to take pollen out of comb, and if so, what is the best way to do it?

Mr. McEvoy: Take a sharp honey knife, and heat by placing hot water in a can, with a lamp underneath it, and shave the cells to the base; it is wired comb, and is still foundation, and it will pay to do it.

Mr. Armstrong: The way I get rid of the pollen in the surplus comb, is this, I save all those combs that the pollen is in till the spring and I hive my swarms on them.

Mr. Timbers: I go over mine every spring; I take my knife and stick it in the back of the cells of pollen, and I turn the knife flatwise and I can turn them out every time. I never put old pollen on.

Mr. Evans: I practice the same way as Mr. McEvoy, only I don't use wired combs.

Mr. Armstrong: Mine is pollen put in this year, the latter part of the season. There was plenty of pollen coming in but very little honey, and they stored it in the upper combs. I have queen excluders on all my hives. If I went to work to shave off the combs in a great many yards I have seen I would have a month or two's work.

Mr. McEvoy: I scraped the wax off the sides and uprights last year, and I had 195 pounds of wax. All the combs that have pollen go by themselves; all the white combs go by themselves, and all the dark combs go by themselves. I shave everyone of these that have pollen in, that way and it is possible because every comb is wired, and there you have the sheet foundation. It is profitable to do it.

Mr. Robinson: I have followed the method practised by Mr. Wilson, of Thamesville. I found in my experience in my locality that my bees had quite a tendency to carry pollen up into the extracting combs; and sometimes when I was cleaning my combs, as I do every winter, I would find quite a patch in one of my extracting combs that was fairly well filled with pollen. I made a box about the size of three of my hives, and put rest irons along each side at bottom instead of top, the same as are found on a beehive. When I first put my combs in, I turned them around and shoved them down until I got the box filled, and then I poured in water. I left the combs there for three days. I then took them out, and took out about half of the pollen quite easily with a little spray pump that I use. That was not quite satisfactory. At one time, being away from home longer than I expected, I left some of the combs in the box three days longer, and when I came to take them out I cleaned all the pollen out in the same way, all but a little bit in the bottom, and it expanded with the water. I put my combs in the extractor, threw out the water and then put the combs up in a dry place, and in a few days I could take that comb, and nearly all these little bits would fall on the floor. Last spring I made two boxes and left the combs in about twelve days, and when taking them out arranged it so that I could have them on a slant, and I could then wash them out in a few minutes. I afterwards took as nice honey out of those dark combs as out of a new comb.

Honey Dew.

Q.—How can you tell honey-dew from honey?

Mr. Evans: If you attemp to heat it it will nearly all turn to froth.

Bees Starving Brood.

Q.—Do some bees starve their brood with honey in the hive?

Mr. McEvoy: Yes.

Feeding Between Bloom and Clover.

Q.—Is it advisable to feed between fruit bloom and clover, when the super is partly filled with fruit bloom honey?

Mr. McEvoy: Yes. They won't carry that down fast enough to keep pace with the larvæ.

Killing Foul Brood Germs.

Q.—Are foul brood germs killed if the wax moth destroys the combs?
Mr. McEvoy: I should say they were.
Mr. Lowey: Will the moths consume the honey if there is any there?
Mr. McEvoy: No.

FOUL BROOD.

By Miss M. Treverrow, Meadowvale.

I received a letter from our Secretary, Mr. Hodgetts, asking me to write a paper for this convention, to which I replied that, as I had contributed to the programme last year, I thought a new name would be a greater attraction this year: and as there were so many members of this Association who, by their larger experience, were better qualified to write, I would rather he would appeal to them. A second letter from Mr. Hodgetts set aside my objections, and hoped that I would reconsider my decision, which I interpreted to mean that he would not take "No" for an answer, and being naturally disposed to obey the behests of my superior officers, I concluded though someone had blundered it was mine but to write—or to try.

I have not chosen the subject of "Foul Brood" because I am an authority upon it, for I have had no practical experience with the disease; but because it is a subject in which I am very much interested, and one that I believe every bee-keeper should be interested in, and acquainted with, if not practically, then theoretically, with such a sound preventive theory, that its execution shall keep his colonies impervious to disease.

It would be impossible for me to write a treatise on "Foul Brood" that would be interesting or instructive to experienced bee-keepers, but if the statement of what I am doing to keep my colonies free from disease, shall lead to a discussion in criticism of my plan, a discussion which will be full of good points for the use of those, who, like myself, have very little experience in the matter, I shall not have written in vain.

I believe I received my first lesson on "Foul Brood" when I had only five colonies, and only new hives to work with. When the bees swarmed, I used full sheets of foundation as each one was filled with honey, till I had tiered up enough supers to give me the largest surplus per colony I have ever had. I said to a bee-keeper who visited my yard at that time, and who was acquainted with its condition, "I hope I have no foul brood in my hives." I always had a dread of this disease. He replied, "There is no danger of that, they were good healthy colonies when you got them, and you have been treating them for foul brood ever since by giving them so much new foundation and new hives. I hardly appreciated the lesson at its true value at the time, but it has recurred to me many times since, and has almost reconciled me to the use of the, still objectionable, wax press, that makes a frequent change into clean new quarters practicable, and assists very materially in avoiding disease.

In the spring of 1905, my queens were clipped by two experienced bee-keepers, one of whom gave me a hint in regard to the effect of strong colonies on foul brood, although he only said, as he contemplated the strong force of bees in the hives, "It is a sign that there is no disease in them, when you see colonies as strong as these." The other, finding a hive with a large proportion of drone combs in it, asked for worker combs to replace them. When I

brought him combs from an old brood chamber, he said, as he put them into the hive, "I would not do this in many apiaries for fear of foul brood, but I believe it is safe here." From the first one I learned the importance of keep-colonies strong; from the latter that there was a risk in using old combs.

At every bee-keepers' convention that I have attended, there has always been a great deal said about the danger of feeding honey back to bees. It has led me to adopt the plan of feeding only pure white sugar syrup.

I have been keeping bees for eight years, and in that time my apiary has been examined four times by foul brood experts, although the inspector has only visited it once in an official capacity. My experience has given me four rules for the avoidance of foul brood. They are: To keep the hives clean by renewal of foundation; to feed only pure white sugar syrup; to keep the colonies strong; and open to inspection. Easy rules some will say; but sometimes one is very loath to destroy a well formed comb when blackness and old age are its only apparent faults, and there is quite a temptation to see what a weak colony will do through the summer rather than reduce the size of the apiary, and who would not hesitate a little at the thought of feeding all pure sugar with a stock of low priced honey on hand, that might be used if there were no danger of contagion. While a visit from the Foul Brood Inspector would inspire much antagonism with some bee-keepers, as is evidenced towards inspectors generally.

Ontario can boast of its Medical Health Officers, its Isolation Hospitals, and forms of quarantine, instituted for the protection of human life against contagious diseases, also inspectors of horses and cattle, that have been appointed to control the spread of disease amongst these animals, and six foul brood inspectors, whose ambition it is to stamp out foul brood in Ontario. But opposed to these officers and institutions, are forces more powerful than they, acting unitedly in their respective spheres.

The banana vendor will store green fruit in his dormitory, where contagious diseases are rife, and when they are ripe sell them to his customers at 5c. or 10c. per dozen and furnish him microbes free. And the man who highly appreciates the benefits of an isolation hospital that affords treatment and shelter to his neighbor when he is attacked by a contagious disease, is often willing to sacrifice the lives of all his neighbor's family rather than go to an isolation hospital himself, and forms of quarantine have to be maintained sometimes by a cordon of police.

The inspector of horses has to contend with the man who will drive a diseased horse into a public shed and tie him where a friendly horse on either side may rub noses with him, and contagion may be increased two-fold thereby. And the Foul Brood Inspector has had his own experience with opposing forces, too, in the bee-keeper who was too sensitive to own to the existence of disease in his apiary and tried to cure it on the quiet; the timid ones who knew of existing disease in neighboring apiaries but were afraid to inform; the owners of said apiaries who were ready to become the mortal enemy of both informant and inspector, if these questionable colonies were interfered with; and the many who once kept a colony or two, or four or five perhaps, and when they died of he knew not what, left them on their stands, a menace to all the apiaries within miles of them.

But a better day is coming. The reports of our Foul Brood Inspectors for this year show that they have received letters from 660 bee-keepers in this Province, asking that their apiaries might be inspected, and of that number, it was found when they were inspected that 396 of them were not diseased. While it is gratifying to know that such a large proportion of the apiaries inspected were free from disease, it must be just as gratifying to the inspec-

tors and to the Government that appointed them to know that there are nearly 700 bee-keepers in Ontario, who have no longer any antipathy to, or careless indifference towards, but a decided appreciation of the benefits of free inspection. And we have reason to hope from this year's Foul Brood reports that if the bee-keepers continue to take advantage of their privilege of inspection, and maintain a course in their yards that shall tend to healthful conditions there, it will not be long before Foul Brood shall cease to exist in Ontario.

The CHAIRMAN: We have all enjoyed this paper very much, and it is now open for discussion. I hope it will bring out much food for thought from the various members.

Mr. EVANS: This is one of the finest papers on foul brood I ever heard. I think it is a good idea to use as much foundation as possible, and keep replacing old combs with foundation. I do not know how much wax other bee-keepers get out their combs, but I have been keeping count and experimenting, and with my Gemmell press I get from 2½ to 3 pounds from eight Langstroth frames. Consequently you can extract your wax and replace it with foundation at a profit.

Mr. McEVOY: I do not like to let Mr. Evans get one inch ahead of me. This lady has set a pattern for the whole of us. She goes in for thorough cleaning and new combs. It is all right.

FOUL BROOD INSPECTION.

REPORT OF INSPECTOR M. B. HOLMES.

The individual occupying any responsible position must count on the day when an account will be wanted of the stewardship, of the faithful discharge of duties incumbent, of the safe guarding of interests involved, etc. Happy indeed that steward who contemplates the approach of that day of reckoning calmly, renders the account gladly, and hears the "Well done."

Answering the call of the Ontario Government in the spring time of this year of grace, I became Inspector of Apiaries under the Foul Brood Act of the Province of Ontario. In the counties to which I paid official visits during the season it devolved upon me in addition to my duty regarding foul brood, to endeavor by all means within my power to bring some ray of comfort or hope to the many who had suffered from winter losses or the excessive heavy spring dwindling. The winter losses in some instances had struck very sadly. Where the proceeds of the apiary had in past years played such an important part in the annual payment on the farm this season finds that source of revenue cut off.

May we not reasonably hope, however, that the trying experiences of this nature will result in giving us better bee-keepers? Some one has put it:

> "The good are better made by ill,
> As odors crushed are sweeter still."

and did not Rudyard Kipling say in the course of one of his addresses, while on his Canadian tour: "I doubt whether unremitting prosperity is good for the individual." Surely, this year of trials, losses, and reverses among bee-keepers must result in bringing out the best that is in the noble army of apiarists throughout this fair land.

I have allowed no opportunity to pass where a word in reference to better queens, closer attention to the requirements of the apiary, etc. might serve

the purpose of cheering and encouraging those who were despondent. I considered this a part of my duty, and shall continue right along in this pointing out that in bee-keeping, as in other occupations, trifles are not to be despised.

The nerve of a tooth, not so large as the finest needle will, under certain conditions, put a strong man out of business for the time being. A defect, trifling of course, in a hive corner, or the make up of a hive, may spoil the prospect of a surplus from the colony. A fault, trifling of course, in the queen bee, may cause that colony however nicely hived and cared for otherwise, to be a miserable failure. A shortage, trifling of course, in winter stores in the hive will cause the loss of the colony from sheer starvation when thirty pounds of syrup at a cost of ninety cents would have insured it in that particular at least.

Again, referring to the losses and reverses of 1907, and the depression resulting therefrom, I would like to ask: Does the agriculturist whose live stock or buildings have been destroyed by lightning or other cause sit down and quit the business? Not at all. He braces himself to meet the new conditions: he erects new and better buildings, and looks about him to secure live stock even better if possible than those which were lost.

Again, does the agriculturist whose broad fields in an ordinary season are covered with the finest crops and pasturage, but in an extraordinary year like 1907, are scant, brown, and disappointing as a result of frost, drouth, and general unfavorable climatic conditions:—does the farmer in the midst of such surroundings sit down and quit? No. He rises equal to the emergency, and buys the necessary food and provender to carry his animals which he prizes so highly over to the next season of full and plenty. And are the people engaged in bee-keeping less courageous than these? Are they less resourceful than these? On the contrary, and fearless of successful contradiction, I claim that those engaged in the production of honey are quite equal, from any view point, to any other class or section of the community. And having known a little of the mystery of the hive, the thorough organization and government of each colony, the untiring industry, the perfect cleanliness and order, the regard for squares and angles as if working to plumb line and rule: having observed these and many other signs and mysteries in connection with the production by those marvellous workers of that wonderful article of food, so wonderful indeed that scripture comes to each member of the human family with that venerable exhortation,—"My son, eat thou honey for it is good:"—having observed and known these things, they will not be daunted by one season of reverses and crop failure, but will double their diligence to make this fair country what it was originally intended to be, "A land flowing with milk and honey."

In the discharge of my duty as Inspector of Apiaries I found some cases of chilled brood, then in other instances starved brood, either of which caused the owners uneasiness and alarm. It was also my privilege to see where Inspector Wm. McEvoy had cleaned up foul brood, and everything seemed clear and flourishing. It was certainly refreshing to hear the people speak in such high terms of Mr. McEvoy and his work as Inspector.

Foul brood was found in one instance at a place where I had not been invited or notified to visit, a very practical demonstration of the fact that the Department of which Hon. Nelson Monteith is the head showed a clear knowledge of the situation and its requirements in making provision for a more thorough inspection of apiaries.

The instance just referred to was only discovered very late in the season, and the owner very promptly offered to destroy colonies in which traces of

disease were discernible, with the understanding that I would pay another visit of inspection very early in the spring of 1908. Other instances there were where honey had been extracted from brood combs and dead brood was present in consequence. This was explained, but the owners asked to be kept in mind and visited again in the spring.

In conclusion, "The Condition of the Industry in Ontario," of which the programme committee requested me to speak, may be briefly summarized as follows: In the midst of great loss there is abundant reason to take courage. The thousands of colonies which I saw, and the still greater number which I did not see in the very short season, are evidence conclusive that our beloved industry will recover and right itself from the shock and shrinkage of 1907, and develop, flourishing to an extent beyond even our wildest estimate.

Before resuming my seat I would like to quote one verse of a sweet little poem from the pen of Dr. C. C. Miller, whom we have known only to love:

"We think of the mercies unnumbered,
Vouchsafed by our Father above;
Whose watchfulness never has slumbered,
Whose banner above us is love.
As each from his field of endeavor
Has come to this brotherly feast,
May the poison of envy forever
Be vanished and good will increased.
We sing of His grace and His mercy,
Recall we His watch-care so great;
We sing of good fellowship, brothers,
And banish the discord of hate."

Report of Inspector J. L. Byer.

I am sure you will understand my feelings after listening to that admirable report of Mr. Holmes. I have not prepared a written report. I accepted the position against my will. However, I got along very nicely. I might say, regarding the industry, that I found things much the same as was described by Mr. Holmes. I think seventy-five per cent. of the bees have died in the last two or three years. It is simply an estimate.

But I believe the members of the Association and the Executive wish to hear more on the foul brood work for which we were appointed. I visited apiaries in the counties of Ontario, Durham, Northumberland, Peterborough, and Victoria; also a number of apiaries in the county of York at the request of Mr. Sibbald. Out of some 125 apiaries visited I found foul brood in nearly 40. Foul brood, as a rule, has not extended much farther east than Ontario county, although I found some in Durham county. I also found an outbreak of European foul brood or black brood. Regarding my diagnoses of these different yards in which I found the disease, I did not depend on my own judgment. There had been samples submitted to various authorities, and they were inclined to think it was starved brood. But when I visited the apiary I thought that it was the genuine European or Black Brood, and I submitted samples to Dr. Phillips at Washington, and he informed me it was a bad case of the genuine article. I found this disease in the apiary of one of our foremost bee-keepers in Ontario. He had fed his bees all spring, and out of some 115 colonies he will not put quite 50 into winter quarters this year. In a number of hives I found every unsealed larva dead. With Foul Brood, as you know, about 75 per cent. die after it is sealed over; but with the Black Brood, they nearly all die before it is sealed over. Instead of having this little black head that starved brood

has, the larva all turns dark, and is stretchy; it is more of a jelly-like consisteney; and it has an entire absence of the glue pot smell, but the odor is rank, something similar to decaying flesh. In Victoria county, one of the most extensive centres of bee-keeping in Ontario, I found quite a lot of foul brood. I found an apiary of 35 colonies, and we destroyed everything there; there were only four or five colonies free from it, and the only cure was to destroy the whole thing.

In one case in my district there was some foul brood in North Ontario, and I was not called till September. I consulted the Department, and they said to use my own discretion. I went there and spent one day and came home. I believe for miles that section is diseased. I advise the person who has charge of the inspection work in the spring to first of all visit that section.

Report of Inspector H. G. Sirbald.

The condition in the district for which I was appointed is not much different from the districts of the two gentlemen who have reported. I found very many empty hives. In some apiaries it was like a grave yard this spring. You could see 100 beehives without any bees. In one yard which I have in mind there were about 175 colonies in the fall, and they only had about 50 left, and those were not much in evidence; they were very weak. It dawned upon me very early in the season that we could not have a very big crop of honey this year, even if the nectar yielded every day the flowers were in bloom.

The causes of the losses perhaps would be of interest to you. In my opinion the first cause was dysentery. I tried to make up my mind as to why they had dysentery so badly last winter, and I cannot come to any other conclusion than that they had an excess of pollen and honey-dew in the hives. Then I found another cause was too much food. That seems rather strange, but in places where they had a fall flow, the buckwheat yielded well, and people did not look at their colonies, I suppose, and they filled up the brood nest without any supers on, and kept crowding the queen until very little brood would be hatched. The old bees, wearing themselves out gathering the honey, would leave no one to take care of the home through the winter, and they died. In every buckwheat section I visited they were overcrowded with honey. One man I saw extracting about 35 pounds per colony from dead colonies when I was there in June. So that there could not have been any brood in the fall when they were gathering that honey. Now, to overcome the trouble of pollen I would feed sugar syrup on top of the pollen in the fall. They then live on the sugar syrup through the winter. People ought to watch for the honey-dew; it comes in early in the morning and usually at a time when no flowers are yielding, except it might be basswood. If the bees are getting their honey from the top of leaves and on trees it is honey-dew. Now as to foul brood. I was not able to inspect the whole of my district. I went only to those districts where I was asked to go, and where they were suspicious of foul brood existing. I found foul brood in nearly every instance. I did go to three or four suspected places where it was only starved brood. I visited about 80 apiaries where bees were kept, some large and some small, and out of the 80 I found foul brood in 44. If I had visited the whole district the percentage would probably not have been so great. I was not able to visit any of these yards a second time. I arranged with some local bee-keepers to see that the work was carried out, and only in two places had I to go back. One place I visited I advised the

man to shake all his colonies. They were all diseased; and I told him if he would shake them all and put the brood of the stronger ones on the weaker ones he might save all his colonies, and that would necessitate another shake in about ten days. The first time he shook them according to the McEvoy plan; and in every particular, in the first shake, when I went to visit him again, they were all clean. But in the second shake they were all diseased. I did not see the work done, but the man told me he had done both lots alike, I think the mistake was that they were shaken between the flow of clover and basswood when there was no honey coming in. I believe that to work out this plan they must either have a flow when you shake them, or they have got to be fed so as to make them build comb and consume and get rid of the diseased honey that is in them in the first shake. I think that is where some fail.

Mr. Byer: I wish to state I did not make a general examination, or the percentage would not have been as high as it was with me. I simply went where I was called, or directed to go.

Report of Inspector Jacob Alpaugh.

I am like the rest of the inspectors; I have not prepared a full report, except that which has gone to the Government; at least I reported every week, and only have a few notes for this meeting. You find very many bee-keepers through the country whose apiaries have got the disease and they do not know it. I have found some that did not know there was such a thing as foul brood. I have inspected apiaries in the counties of Wellington, Waterloo, Perth, Huron, Bruce and Grey, eighty apiaries in all; forty-three of them contained foul brood and thirty-seven of them were free from the disease. I found foul brood in five different counties and sixteen different townships, as follows: *Wellington*: Garafraxa and Nichol townships; *Waterloo*: Wellesley; *Perth*: Ellice, South Easthope, North Easthope, Wallace, Downie and Mornington; *Huron*: Grey and Morris; *Bruce*: Brant, Saugeen, Bruce and Carrick; *Grey*: Keppel.

I inspected most of the diseased apiaries the second time, and found they had been treated, and according to directions, if their own stories are correct. But as to a complete cure being effected, I would not like to say without further inspection, as I found a good many of those apiaries had been inspected years ago and had been treated over and over again, and still the disease existed. It is pretty hard with one or two treatments to get rid of the disease. Mr. McEvoy will know that. His instructions have been all right, and they have followed them as near as they could, but you know lots of people do not do things very closely to instructions. I have had great times hunting for old hives stored away with the disease in. I have found them up in a loft or down in the cellar. I kept on enquiring, and they would say, "No more." And I would perhaps spy one some place, and I would find foul brood in the old combs.

In reference to the industry, I have found things pretty much as the other inspectors. Bees have pretty badly dwindled down this spring. I would judge anywhere from 50 to 75 per cent. in the territory I have been in; and the colonies that were left were only about 50 per cent. as good as they ought to be, being weak and in poor condition for the flow. However, I think they will pick up again and be as plentiful as ever. We may not have such a spring as we have had this year for some time again. I only inspected where I was called, or where I had any suspicions of disease, which makes the percentage a little high.

Report of Inspector James Armstrong.

As Inspector of No. 5 district, I beg leave to report as follows:

I inspected 212 apiaries in the Counties of Haldimand, Norfolk, Oxford, Brant, and the City of Brantford, and found foul brood in 103, making nearly 50 per cent. of the apiaries diseased. The total number of diseased colonies were 340, making about 17 per cent. of the colonies diseased.

I burned about 55 colonies during the season, and there were about 300 colonies treated, so I had to make a great many extra calls where I found foul brood, until it was cleaned up.

One thing I tried to impress on the minds of bee-keepers was the importance of knowing foul brood at the first glance they took at a comb. I think this is one of the most important things about the foul brood question, and if we could educate the bee-keepers up to that point we could soon wipe foul brood out of the country and keep it out.

There is another very important matter that should be looked after at once, and that is in regard to keeping bees in box hives. It should become law as soon as possible that no person should be allowed to keep bees in other than in moveable frame hives, because it takes up more time and therefore causes the expense of wiping out the disease much greater.

Everywhere I went the bee-keepers used me well, and I had no trouble with any one. All were willing to help me in every way they possibly could and were glad that I called on them, except in a very few cases where they did not understand the situation.

So far as losses are concerned they were not as heavy in my section as the others have reported. The winter losses were not very great. Most of the territory was in the county of Norfolk, which I covered, and it is a buckwheat county, and the bees as a general thing are not looked after very closely. There are some fine bee-keepers there, but the great majority of them are "go-as-you-please," and their hives are well stocked with honey in the fall, and therefore they winter very well.

Report of Inspector Wm. McEvoy.

I have visited 82 apiaries since May and I found the disease in 20, with 62 clear of disease. One of these 20 was very bad; there were 66 colonies out of 101 diseased; the other 19 apiaries had a few colonies here and there of foul brood. In those 62 apiaries which were not diseased, there was hardly a colony but had more or less starved brood. Speaking of losses, Mr. Armstrong reports that the percentage was less in his district. That is correct, because as he says, there is more buckwheat and they winter outdoors and fill up. But in the parts I went through there was over 75 per cent. of loss. Taking the Province as a whole, there is over 75 per cent. I made over 1,000 pounds of wax from purchased comb this year. Stores and starvation and pollen and bad spring had a great deal to do with it. Some of them spoke about filling the brood chambers up with buckwheat and not having the young bees. That was correct in many places. In other places they stopped breeding. In all cases there were not enough young queens to carry into the winter.

Mr. House: What was the age of that brood at starvation?

Mr. McEvoy: It was from young larvæ, still I should judge some of it 17 or 18 days old.

Mr. House: I wish to take objection to the term starved brood. How can brood starve after it is sealed? As I understand the nature of the larva, it is fed and sealed; it has lots of food at the time the sealing takes place.

Mr. McEvoy: That is a great disputed point all over the country. You will find in colonies, punctured cells and you will say it is foul. No, it is starved. It will be starved from the stage when it is a young larva, just after it is hatched. You will find the larva where it comes to a coil; it won't meet in the centre. You will find some about the same age, plump and fat. You will find it dead at all ages. You will find a great deal dead at nine days lying on its back and coiled up. You will find it again where they fed some and capped it, and they didn't give enough food to carry it out; and some of it will die under the capping. You will find again where some of them will hatch out and cut the cap off the cell, and they haven't strength enough in their little jaws to make a neat cut. You will never find that where they are well fed. You can have it starved, capped or uncapped, but the great proportion it before it is capped.

Mr. House: I stand upon my reputation when I say I believe you have got a pretty good start for Black Brood in Ontario.

Mr. McEvoy: Can that be cured by removing the queen?

Mr. House: I have stopped or checked the disease for that season by removing the queen, and the disease reappeared the next spring. It passes through several stages. European Black Brood in the first year is not as prominent in its destructive work as in the second or third year, when the virus of the disease gets a stronger foothold.

Mr. McEvoy: Would you consider that European Black Brood is foul brood?

Mr. House: I consider both diseases are foul brood; but they take a different course and need a different treatment. They are both germ diseases, although Dr. Phillips failed to get cultures from the worst cases I had this season. They were bad cases of European foul brood.

Mr. Holtermann: Did Dr. Phillips admit by its appearance that it was the disease and yet that he couldn't get a culture?

Mr. House: He did. I think he made four trials and failed to get a culture. This disease is so destructive that it went through an entire apiary in a very few weeks.

Mr. Burt: The queen lays the egg and in three days it is hatched to larva. Keep it for five days. If it is starved brood it must be starved before it is capped. Will they cap dead brood?

Mr. McEvoy: They never cap a cell of dead brood.

Mr. Burt: If it was starved wouldn't it be starved before they quit feeding it.

Mr. McEvoy: No; they will feed it, but not sufficient food.

Mr. House: Perhaps some of the bee-keepers of Ontario are not familiar with the European Foul Brood. For the last four years I have had considerable experience with that disease and I might give some idea of how the disease appears. There are many colonies that are affected with the disease and upon drawing a comb you wouldn't notice anything wrong from the general appearance of its capping, but if you look close to the larvæ at the age of about four days you will find a little yellowish brown spot about the centre of them. The healthy larvæ has a pearly white color; but the larva is beginning to turn yellowish, and if it turns over onto its back and straightens out it is getting quite sick, and sometimes it will stand upright in the cell. It straightens out before it gets to the age it should, through the sickness. Some die at the very stage we are talking about the larvæ dying, the head turning black first; and if you allow them to lie in that sealed cell for a time they will turn brown and watery. There is no ropiness to the watery part. Afterwards they will dry down in a dark scale in the

lower side of the cell. I never saw a starved larva lie twenty-four hours in the cell; when it dies it is taken outside immediately. There is nothing to hinder the bees from carrying out the larvæ after it dies. I have had the whole brood nest in 300 colonies starved to death before I was aware of it. It was in the month of June this starvation took place, so that there was no sealed brood or larvæ in those colonies of bees. They would clean it out immediately. But with European Foul Brood the bees hesitate to take hold of it; and it is only the pure Italians that will not hesitate to carry it out.

Mr. McEvoy: I can agree with you on your description of Black Brood, but I can't agree with you on starved brood.

Mr. House: To show you how fast that disease has spread, I may say that it has come from Saratoga County, in the State of New York, and to-day it is in close proximity to Buffalo, inside of two years; so that you need not be surprised if it comes across the border. It has wiped out apiaries of 600 colonies in Cayuga County.

Mr. McEvoy: Treat it the same as Foul Brood.

Mr. House: The very description you are talking of here is the first thing I saw in my apiaries of Foul Brood. The inspectors came and told me it was Pickled Brood; and Dr. White at that time in Cornell said it was nothing more or less than Pickled Brood, but that Pickled Brood has all turned out to be European Foul Brood with me.

Mr. Timbers: What was the condition of the dead larva as it lay? Does it look, in the bottom of the cell, before it is disturbed at all like dry Foul Brood?

Mr. House: The first appearance will be that little brownish spot on the larva. After it dies it straightens out in the bottom of the cell, and as it flattens down and dries away it leaves a dark scale in the bottom of the hive.

Mr. McEvoy: That scale they can clean out, but the scale of the American Foul Brood they cannot.

Mr. Timbers: They won't take that out until it has dried to the brown scale?

Mr. House: No. I believe the germs of all foul brood is contained more in the pollen than in the honey. In a colony diseased with European Foul Brood, you will find it first in the queen's cells; the working larvæ dies about the time that they are weaned out and commenced to be fed with this pollen and honey mixed; and that is about the time that this larvæ gets European Foul Brood. He may not show it much until he gets eight or nine days old. He may show it in very bad cases where the hive is thoroughly diseased, all the way from the third day up.

Mr. Dickenson: In regard to the reports of the inspectors, I am more than shocked with the report that three-quarters of the bees in this Province have died. I would like to know what percentage they found amongst the members of this Association, or are the losses among men who are not connected with the Association? I would like also to know whether there is a greater percentage of loss in cellar wintering or outdoor wintering? I never had bees come out better than they did last spring, no spotting whatever; and to be told that three-quarters of the bees of this Province are dead surprises me. We have a lot to learn in connection with the industry. I do hope there will be some method found whereby we can winter bees the same as they can horses and sheep and cattle and other animals.

Mr. Lowey: There has been no inspector from my district in my county. I think the loss is fully higher than 75 per cent. in that part of my district, but it is wholly confined, or nearly so, to non-members of this Association and all through cellar wintering.

Mr. Sibbald: As a rule you will find the men who attend conventions better posted than men who do not. That is the reason I say they ought all to belong to this Association. I noticed in the districts where the bee-keepers had visits from the inspector that they would take more interest in things as a rule; and those visits have had the effect of inducing some to come to the Convention. As far as outside or inside wintering is concerned, I could not see much difference. I have noticed whole apiaries wintered outside nearly all dead, and the inside just as bad.

Mr. Dickenson: I want to know whether our Association is benefitting its members as it should.

Mr. McEvoy: The most of the losses were through outside wintering. A good many of those men did not take any bee journals. Some of them did, and some belonged to the Association, but the majority of the losses was amongst those who did not.

Mr. Byer: I think that has been the experience of every one of the inspectors. I want to say that I dread this European Foul Brood fifty times more than I do the ordinary Foul Brood. In my experience the stains are almost identical in appearance with the Foul Brood. About one-twentieth of this larvæ would assume quite a ropy appearance; nothing very elastic about it, but more of a jelly-like consistency. It was quite black, and had a very pronounced smell. Anyone who once smelled it would know it was different from ordinary Foul Brood, and something more than starved brood. Dr. Phillips wrote me and wondered if a lot of the brood we were calling starved brood was not really the first stages of European Black Brood. I appreciated the interest they seemed to take. I was given to understand by the Department at Washington that anything they could do for us in Canada, they would gladly do. There is no question if you once saw genuine Black Brood you would know it from starved brood. In regard to treatment, I might say a friend of mine tried the Alexander treatment of having them queenless for twenty-one days and then introducing a young queen; and he said unhesitatingly if he had the same thing to do over again he would use the McEvoy treatment.

Mr. Holmes: Answering the question as to whether the losses were within the membership of this Association or without, I might say that in the district coming under my observation, the losses, which were very heavy, were principally outside; they were amongst persons who were not members. I would also say that the careless man is always in error. He perhaps will take care of his herd because if he does not his neighbors will observe it; whereas with the bees he takes it for granted they have sufficient stores. We find him, when it is too late in the fall, coming to us with such questions as this: How do you manage the sugar? Do you just put dry sugar in boxes and feed it to them? He has forgotten what we said. This man learns by experience although he finds it a very expensive teacher.

The Secretary: At the close of the season the results were as follows for the year:

Total number of visits paid to apiaries, 733.

Total number of apiaries examined, 663.

Cases where inspectors had gone back to find out if instructions were carried out, 70.

Total number of hives examined, 14,999.

Total number of apiaries containing foul brood, 264. That is 62 per cent of the number of apiaries examined, which is very large; but you have to remember in most cases these inspectors were sent or written to, to go to apiaries where it was expected foul brood existed. We were very much

pleased to find in the east, in Mr. Holmes' division, there was very little foul brood. In all that section in the extreme east the apairies were practically clean.

Mr. HOLTERMANN: I have been through portions of the Province of Quebec and found apiaries had been wiped out by foul brood, on the admission of those who owned the apiaries. Some years previous to that I spoke to some of the leading Quebec bee-keepers about the matter of the Province of Quebec having no Foul Brood Act. At that time these gentlemen said they did not believe there was any disease in the Province of Quebec. It was within a year or two after that when I was through there and found the disease. This fall I had a visit from Mr. F. W. Jones, of Bradford, Que.,who is perhaps as much in touch with bee-keeping in that Province as any other man is. He said to me, "I am very anxious about the condition of bee-keeping in the Province of Quebec. I am afraid foul brood is going to wipe the industry out to a very great extent." I reminded him of the time when he told me he did not think there was any necessity for a Foul Brood Act in Quebec. I wrote to Prof. Robertson and told him of the situation, and asked him whether he could not do anything to have a Foul Brood Act passed in the Province of Quebec. He suggested that a resolution be passed by this Association, and that it be forwarded to the Quebec Pomological Association, which was the best organization in his estimation to take the matter in hand; and that we ask that Association that the Quebec Department of Agriculture be approached and asked to pass a Foul Brood Act for that Province, and take the necessary steps in regard to the inspection of bees. The Secretary of that Association is Mr. Reid. I certainly think it is advisable to take some step and try to do something to bring pressure to bear upon the Province of Quebec.

Mr. BURT: We have had six inspectors. Supposing a man writes to one of them and says, "I think I have foul brood." The inspector goes there and cleans that yard up at quite an expense to the man, and he finds out the next summer he has got to go again, and he cleans it up again. In a case of that kind would it not be just as well if they found out the locality where foul brood existed and inspect every yard in that locality? If smallpox or diphtheria breaks out in a locality what is the first thing done? They send an intelligent health officer who finds out where that disease exists and stops it. I think it is a good way to enquire for every place in that locality and clean it up. I think for some years we ought to have twenty-six instead of six inspectors. As near as I can find out Ontario is infested with foul brood.

Mr. BROWN: I entirely agree with the last speaker. When the inspector comes into a section he should have authority to go to work and clean it up thoroughly before leaving. A man may have bees and they may die out and it will be two or three years before he has any more, and it is altogether likely it was through foul brood those bees died, and the remains may be lying around for years and years giving the disease.

Mr. SIBBALD: Whenever I visited a place and found a case of the disease I usually went all around there to find out. If the man said he brought those colonies from a certain place and said they were diseased when he bought them, I would go to that place.

Mr. LAING: You have perfect authority to do that, have you not?

Mr. SIBBALD: Certainly. The Department of Agriculture advise us to visit all apiaries where we suspect the disease might be.

Mr. GROSJEAN: I am a little surprised at the inspectors finding so much foul brood. I suppose there are a couple of hundred miles that have not

been inspected this year, and it may be filled with foul brood. I think another year there ought to be some way in having these men meet on a line somewhere. I find there has been no inspector in Prince Edward County. I think Mr. Byer touched on a portion of Northumberland, but I think from there to Mr. Holmes' district there has not been any inspection.

Mr. HOLTERMANN: I would move that we believe and feel that the Province of Quebec should have a proper Foul Brood Act, with the necessary machinery for enforcing that Act, and that a copy of this resolution be forwarded to the Quebec Department of Agriculture, to Prof. Robertson at the Macdonald College, and Mr. Reid, Secretary of the Pomological Society.

Mr. LAING: I second the motion. I think the position taken by Mr. Holtermann is a very sensible one.

The PRESIDENT put the motion, which, on a vote having been taken, was declared carried.

HOW TO PRODUCE AND SHOW EXHIBITION HONEY.

By A. LAING, St. THOMAS.

A friend of mine said of a certain book that it was chiefly remarkable for what it didn't say, and I am afraid that my remarks on this subject are likely to be remarkable for the same cause. However, if I say very little there will be the more time left for the rest of you.

In the first place, I believe it would be well if all apiarists would take for their motto this short sentence. "Quality before Quantity," and if this is advisable for the average bee-keeper, it is an absolute necessity for anyone who desires to produce honey that is fit for exhibition purposes. We must keep this point constantly before us. Now of course, you all agree with me when I say that we must strive to produce the best. The question is, however: "How to produce the best?" and therein lies a lot of difficulty. Well, let us suppose we are trying for prize extracted honey. In the first place, we want good rousing strong colonies, and in the second place we must have a lot of nice bright clean combs, or otherwise the honey stored in them is likely to be slightly colored. Now if we are fortunate enough to get these combs well filled with honey and leave them until they are entirely capped over, and as much longer as we can, we should then have some choice extracted honey, which if kept by itself and not allowed to mix with some other in extracting should put us in a postion where we will stand some chance for a prize.

As to the comb honey, if it be necessary to have strong colonies for extracted honey, it is even more important for comb, and I believe it is generally conceded that the black hybrids cap their honey a little whiter than the Italian bee. It is very essential that the sections should be filled to the very edge, and be entirely capped, and as white as snow if possible; and if your colony is on brand new combs it will materially aid the whiteness of the capping and in getting the sections well filled your motto should be contraction rather than expansion of the colony.

Another important point is the time to put on your sections or combs. This should be done at the opening of the white, choice, flow, for if put on sooner they may get a little honey from the fruit bloom or dandelion, and thus spoil the color as well as the flavor of the honey.

Now as for the showing. I do not know that there is a great deal to be said on the subject, but I can assure you that there is a tremendous amount to be done in reference to the matter. The cleaning up of your sections, and

then getting choice cans to put them in, selecting the bottles and washing and filling, to say nothing of the time you use, is enough to make a thinking man pause and consider whether he will be anything like paid for his trouble. As an illustration: I put in about $10 worth of time on one entry for Toronto Fair and got $1 prize, and this is only one case out of many.

In showing, everything of course must be put up in the neatest and most attractive manner, or else you are knocked out from the standpoint of display, no matter how good your honey may have been.

Another exceedingly interesting point is the fact that the article that you do not expect to take any prize sometimes takes the red ticket, while the one you are positively sure will take a red, gets a fourth, or none at all, if there happens to be a fifth exhibitor. From the experience I have had, I would say that the Department of Agriculture should pay the honey exhibitor $5 a day as a public educator.

My wife says that if you want to know how to put up an exhibit of honey, ask those who have never exhibited, as they appear to know better than those who have. In exhibiting we hear many interesting remarks. For instance, two ladies came into the honey building, and one of them gave one glance around, and remarked to her companion "Oh, look at all that honey, and not one pound of it pure." That, of course, was news to me. This year one lady referred to our granulated honey as horse radish. I had on exhibition a miniature apiary and extracting house made of beeswax, and this was an exhibit of great interest, and well understood and greatly appreciated by very many people; but even this, plain as it appeared to the great majority of the people was yet a mystery to some, one lady explaining to her companion that it was a graveyard made of cheese. (Laughter.)

Many wish to buy our beeswax for maple sugar. Three young ladies and a young gentleman came up to our counter and one of the young ladies bought a five cent cake of beeswax, and then the young man wishing to be gallant bought four 10c. cakes of wax, and taking the bag passed it round to the girls and they each took a cake, and then the one who had bought the 5c. cake asked him what they were to do with it. "Why eat it" he innocently said; and then she fairly roared, and the wax was exchanged for honey.

Mr. Sparling: Mr. Laing has been so extremely orthodox he does not leave much room for criticism. I thought he was a little hard on his own beeswax when he compared it to maple sugar. I would refer him to Miss Treverrow to learn how to make beeswax for exhibition purposes. It won't be mistaken for maple sugar. In speaking of taking comb honey, I suppose it is practically impossible to do that without swarming. Mr. Laing forgot to tell us what he would do when his bees did swarm when he was taking his comb honey. He was speaking about it being necessary to have the sections nice and clean. It is also necessary to have the crates nice and clean. At the Industrial here this year, even with the prize that is offered for the best we got dozens of sections, and there were some very dirty crates given to me.

How would you take off your extracted honey? I have tasted it sometimes with quite a taste of smoke on it. In fact I have tasted my own, and it sometimes tasted a little smoky. I have tried to smoke the bees all out and take off the super without removing the combs.

I do not think there is room for any criticism on Mr. Laing's paper.

Mr. Laing: I think that with a colony that started to swarm after you had started in for comb honey, the chances are rather slim for getting very good satisfaction out of them. As to taking off clover honey, I would experi-

ence no difficulty whatever, because it is the time of year when the bees would be gathering, and I would require to use but very little smoke. If it was a time of year when they were not gathering, it is a very easy matter to use a bee escape.

Mr. McEvoy: I think if there is a prize list in this Province that needs a severe revising it is the Toronto Industrial. It is not right in many respects. There is a prize offered with twenty-five points for quality and seventy-five for the glass. That is putting the prize on the glass. That is not right. It has been going on for a long time, not only in the United States, but in Canada, offering prizes year after year for granulated honey. In the horse ring why not offer prizes for the oldest horses? I say take that prize and put it upon the sections and the best qualities of honey; and in all cases have it inserted "Quality to rule" This question of display was started in 1879 by D. A. Jones. It never should have been. Every man that exhibits for quality will display in the best possible way. A year or so ago a prize was given in the beeswax line, and the preference was for yellow wax—a first prize on second class wax at Toronto Fair. Wax made from cappings is the best material. It is worth five cents more at least. I myself would give ten cents for it for foundation.

Mr. Sparling: I think Mr. McEvoy is altogether out. The Fair people want to make an attractive exhibit. They offer a great many prizes for quality, and it is quite right they should offer a prize for display. In the majority of cases it is the quality that governs.

Mr. McEvoy: What do you think of 25 points for quality and 75 for glass?

Mr. Sparling: I think it is quite right, because the Exhibition Company wish to make a pretty show for the public. If you put it up in a plain glass bottle you could make no show to attract the eye, and that is largely their object in offering prizes at all.

Mr. House: Our New York State Fair Commission places at the head of their judging qualifications body and flavor first; they carry the highest points, about 75 points; and then they take into consideration the display. The exhibition names the number of articles you shall exhibit, no more and no less.

Mr. Sparling: It is quite right for the Exhibition Company to make a display, and if they make the majority of their prizes for quality the exhibitor can find no fault when they give an occasional prize for display, which you are not required to enter if you don't wish to.

Mr. House: We have a special prize for display: that induces us to come better equipped with a larger exhibit.

Mr. Laing: Aside from the general display of the whole exhibit, in the great bulk of the entries, the prizes are given entirely for quality. A number of them have 20 per cent. for display and 80 per cent. for quality. I think you will all agree with me that is reasonable. Aside from that there is only one single entry where a display is mentioned in preponderance over the matter of quality, and that is the one where Mr. McEvoy mentioned the matter of fine glass, where it says 75 points for display and 25 for quality. The idea of that is that the Fair Management are anxious to get bee-keepers to do the very best they can as far as beautiful display and lay-out of honey is concerned; and as an extra inducement they offer the 75 points in one entry for display.

REPORT OF EXECUTIVE, 1907.

Your Executive beg leave to submit the following report as to membership:

Membership. Eleven Affiliated Societies report a total membership of 143; single memberships, 130; making a total membership of 273, which is an increase over 1906. Of this increase the larger part is accounted for by the change in the Constitution, which requires ten members from each affiliated society in place of five as in past years.

Foul Brood Inspectors. Hon. Mr. Monteith, in accordance with his promise at the last annual meeting, submitted the matter of inspectors under the new arrangement to your board. In accordance with our suggestions, the six inspectors who have been acting this year were duly appointed, and have, we understand, carried out faithfully the work to which they were assigned. From the official reports of their visits and the work done, we have hopes that foul brood will rapidly diminish throughout the Province, resulting in a corresponding increase in the number of colonies and the crop of honey therefrom. The following data shows the total number of visits paid, apiaries examined, and foul brood reported:

Total visits, 733; total apiaries examined, 663; total hives in apiaries, 14,992; total apiaries containing foul brood, 264.

Honey Show. Your Executive, after considering the matter of the honey exhibit at the November Show, decided to return to the previous system of offering prizes. In accordance with this decision, a full list was prepared and printed, together with the other sections in the general prize list. It was felt that a better showing could be made with far less expense and much less trouble than by the scheme adopted last year of an Association exhibit.

REPORT OF HONEY CROP COMMITTEE.

By H. G. Sibbald, Claude.

Your committee met in the Secretary's office on Aug. 7th to consider the reports of the honey crop from the various members and districts. A much larger and fuller response to the secretary's circular was received than in former years, showing an increased interest in this report and an appreciation of the efforts of the Association to assist the bee-keepers in securing better and more uniform prices. The prices suggested by your committee were 11½ to 12½ cents per pound wholesale for No. 1 light extracted; retail, 14c. to 15c.; No. 1 comb, $2.50 to $2.75 per dozen, wholesale; No. 2 comb, $1.75 to $2.25 per dozen, wholesale. So far as we can understand, these prices were generally realized and satisfactory expressions to this effect have been received from local associations.

Mr. Sibbald: We met in Toronto here about the 7th August, and we had over one hundred reports in then, and a great number came in afterwards I believe. We were criticized somewhat for not having the report out earlier, but we find that we cannot get the reports in any sooner, and that is not our fault. We cannot get our statement out until we get the reports in, and the members are not very prompt in returning their reports, and they will have to take a little of that blame themselves. As soon as the Secretary received enough that he thought we could consider, he sent us word. We considered them, and we considered the reports in the American *Journals*, and the

reports from Quebec, and in one way and another we had reports from California and other States and places that we thought would affect our market here. We also took into consideration the fruit. We had with us Mr. Hodgetts, who is also Secretary of the Fruit Grower's Association, and he was right in touch with the fruit crop report; and we sent out a statement to all the members and to any others who had sent us in a report, and we had it published in the daily papers of Toronto.

It has been suggested to me we ought to send a number of reports to the secretaries of the different affiliated societies, so that they could send them on to their members. I think that is a very good idea. If we are appointed again we will bear it in mind.

The co-operative work spoken of yesterday would be all right, and I would not like to discourage it, although we tried that a few years ago, and we who had to work on it got a little bit discouraged. We found a great many obstacles in the way. We are glad to hear criticisms, and we will try to work along for the good of all, again.

Mr. Brown (Toronto): I think every member of this Association should send the names of every bee-keeper to the secretary here, whether he is connected with the Association or not, so that a report of that crop may reach him, so that he may know the position of the honey crop and the prices. That will help to keep the price up to an even standard all over the Province.

Mr. Wyld: I think this Committee has done its work as well as could be expected, but I think there might be some means provided for spreading the information a little bit earlier, which perhaps would not be final, but correct as far as their information went.

Mr. Sibbald: There might be two reports sent out.

Mr. Wyld: There might be a report made every two weeks after the honey was beginning to be harvested, if the information came to hand.

Mr. Chrysler: I think our present Committee could not be improved upon. There might be some way where we could get more than one report, but I think that Committee is placed in a position to judge what our honey should bring better than any other individual honey producer can be placed in, by getting in touch with every bee-keeper that it is possible. I think the men who have had it in hand have done first rate. If those reports cost $500 apiece they are cheap to the bee-keepers of Ontario.

Mr. McEvoy: Yes, they are cheap at $1,000.

Mr. Chrysler: Producers of honey in our Province should have the say as to what prices should be, making due consideration for the consumer. The consumer and producer are the two persons who should be mainly interested in this matter; and who is there in this Province better able to make those prices than the producers or their representatives? We have chosen representatives to take this matter up; they have done the work thoroughly, and I think it is one of the best features of our Association.

Mr. McEvoy: They did well, but it would have been worth $100 to me had that report been out two weeks sooner. Of course, we were to blame ourselves more than the Committee.

Mr. Chrysler: Why not sell subject to the findings of the Exchange Committee if you wish to sell early?

Mr. Lowey: I thought at first it was a little late, but since I have considered the matter I think it was as early as it could be got out. I am more than pleased with that Committee. I think we should appoint the same Committee again.

REPORT ON HONEY EXHIBITIONS.

By E. Grainger, Deer Park.

I am pleased to state that the conditions for the exhibitors at the Canadian National Exhibition are much more favorable for the bee-keepers than they were a year ago. Many of you will remember how for years we have been looking forward to the time when we would have a suitable building in which to display our honey, and how we have been hampered through not having conveniences, being placed sometimes in tents and latterly in a barn of a building, poorly ventilated and poorly lighted. You will understand how much we appreciate the improved conditions. We now have a building which is pretty nearly all that can be desired. Not only are the windows so arranged to let in light at the sides, showing the honey to the best of advantage, but the lights from the roof are so arranged that the building is bright even in dull weather.

I attended all the meetings of the Committee, and have had the opportunity of presenting the views of the bee-keepers in so far as I have been able to ascertain the same, and have always been kindly and courteously treated by the officers and other members of the Committee. Heretofore I do not think the bee-keepers when making requests for favors have gone about it in just the right way. Some people, so long as they get what they want, neglect to say "thank you." I have known of some cases where the request has been made in such a way, and at a time when the officials were overburdened with work, that instead of having their request granted, they have been invited to go to a warmer climate. As you know the honey department occupies only one wing of the new building, and as the other departments had no special object in keeping open later than ten o'clock, the bee-keepers found that this would be somewhat of a hardship for them, so they desired to have the building kept open after the usual time of closing. Many people buying honey at the Exhibition do not care to carry it around with them, but prefer getting it just before leaving the grounds. For this reason there is often considerable honey sold after ten o'clock. We bee-keepers made our request to the chairman that the building be kept open an hour later, we agreeing to pay the extra expense of keeping the men in charge. Am pleased to say our request was granted, and to show you that the Exhibition officials as well as other people appreciate a little courtesy, I will read the following letter which we sent them thanking them for their kindness; and their reply to same, through Mr. Briggs, Chairman of the Committee.

Dear Sir,—As representative of the bee-keepers, I am requested by those exhibiting at the recent exhibition to extend to you our thanks for your kind consideration of our requests on all occasions, and especially our request to keep the Agricultural Buildings open after ten o'clock. I can assure you this was very much appreciated by all.

The exhibitors also appreciated very much the kindness and courtesy of the Superintendent of the buildings, Mr. Mills.

Again thanking you, I remain,

On behalf of the bee-keepers,
E. Grainger.

Mr. E. Grainger,
Deer Park, Toronto.

Dear Sir,—Your favor of the 8th inst. is received expressing the thanks of the exhibitors of honey at recent exhibition for the treatment which you received, and can assure you these expressions are not only pleasing but very much appreciated,

and must thank you on behalf of the exhibitors for your consideration in the matter, which was only your just dues considering the trouble and expense which you were put to in placing an attractive exhibit throughout.

I am sure Mr. Mills will be very much pleased at your expressions of appreciation on his behalf. I hope you may be spared to improve upon the exhibition next year, and that we may all have the pleasure of meeting again on a similar occasion.

Yours very truly,

S. E. Briggs.

I have noticed a growing interest in the exhibition of live bees, by the public. It is most amusing to listen to the questions which are asked, and the comments which are made, but it is astonishing the ignorance which is displayed by the public, on matters pertaining to bee culture. These exhibitions afford an excellent opportunity of educating the public along this line. I believe it would pay us as bee keepers to do more in the way of demonstrating, and am sure that the Exhibition Association would be willing to help us in this matter if they were approached in a proper manner.

I would also urge the bee-keepers who have any new ideas or any suggestions to offer along the line of improvements of the prize list, etc., to write me, so that the matter might be brought before the committee at the proper time, and the very best possible results would be obtained from the amount of money which we have at our disposal.

While on my feet I wish to call attention of the bee-keepers to a matter which has come to my notice recently. Mr. H. J. Dager, Dominion Food Inspector, has requested me to call the attention of the bee-keepers at this Convention, to the fact that a Pure Food Law has lately been passed, known as the "Canned Goods Act," which he believes includes honey, maple syrup, and such articles put up in glass jars. It appears that any such article put up in glass must according to the new regulations, be labelled, and have the name and address of the producer, with proper name of contents on every package. The penalty for not so labelling is for the first offence, $2 for each package, and for the second offence a penalty of not more than $24, and not less than $4 for each package? I think if this be true we as bee-keepers should take some steps to ascertain whether or not this applies to honey, and in what way it will affect the bee-keepers. In any case it goes to show that it is best on all occasions to label all honey which we put up. This law applies to retail packages only.

All of which is respectfully submitted.

Upon motion of Mr. Sibbald, seconded by Mr. Laing, the report was adopted.

Mr. Sibbald: I think the bee-keepers ought to show their appreciation of the new building that has been provided at the Exhibition Grounds for the purpose of exhibiting honey; it is a fine building. I have, therefore, pleasure in moving, seconded by Mr A Smith, that a vote of thanks from the Ontario Bee-keepers' Association be sent to the Board of Directors of the Exhibition of Toronto. Carried.

REPORT OF REVISING COMMITTEE.

The Chairman called for the report of the Revising Committee.

Mr. Sibbald: Mr. Pettit and I were appointed to revise the report of last year and we appointed a day to meet here in Toronto and have that work done. Owing to other pressing work he was unable to come and he sent a letter stating that he would leave the work to me. I didn't want to

stand all the brunt, so I went down to Mr. Hodgetts' office and we did the best we could. It was one of the worst reports we ever had to do with.

REPORT OF AFFILIATED SOCIETIES.

Eleven societies have affiliated under the new by-laws adopted last year. Of these 9 have to date sent in their annual reports. The sum of $200 was divided equally among these Associations.

	Members in Ontario Association.	Total Membership.
Brant	10	14
York	14	28
Simcoe	10	10
Victoria	11	16
Middlesex	22	32
Halton	15	17
Russell	13	13
Oxford	11	14
Haldimand	10	11
	116	155

On motion of Mr. BROWN, seconded by Mr. LOWEY, the report as read was adopted.

FINANCIAL STATEMENT.

Receipts.

	$ c.
Cash on hand from previous year	110 18
Members' fees	205 00
Legislative grant	450 00
Fees from affiliated Societies	55 00
Canadian Bee Journal for report of Convention	12 00
	832 18

Expenditure.

	$ c.
Grants to affiliated Societies	199 98
Officers' salaries	25 00
Directors' fees and expenses	100 55
Postage and stationery	24 89
Printing	25 74
Periodicals for members	123 00
Cost of reporting	50 00
Committees' expenses	34 43
Auditors	4 00
	587 60
Balance on hand Nov. 14, 1907	244 58

Mr. EMIGH: I wish to say that although the Government only sent us a cheque for $450 they really gave us $500, as they paid our Secretary's salary.

On motion Mr. SIBBALD, seconded by Mr. NEWTON, the report was adopted.

AUDITOR'S REPORT.

Toronto, Nov. 14, 1907.

We the undersigned, have carefully examined the books and accounts of the Treasurer of the Ontario Bee-keepers' Association, and find the same to be correct.

J. L. Byer,
E. Grainger,
Auditors.

On motion of Mr. Holtermann, duly seconded, the report was adopted.

Mr. Couse: I do not think we have recognized the fact that we have got $2,300 from the Provincial Government this year for inspectors. You all know the expense this year of trying to do away with foul brood has been about three or four times greater than it has ever been before, through the liberality of the Department of Agriculture. This Association, I have not the least doubt, appreciates the efforts that have been put forth to assist the bee-keepers of the Province. My experience in connection with this matter has been that the Department is very anxious to help us. They have shown it this year most liberally, and I certainly have great pleasure in moving a vote of thanks to the Minister of Agriculture for the liberal way in which the Department has helped us this year by appointing six inspectors and supplying them with funds to do away with foul brood. Personally I am more than pleased.

Mr. A. Smith: I have much pleasure in seconding that motion.

The Chairman: The Department, I am sure, has been very liberal with us during the past year, and I think all the members present who know of the work which has been accomplished must give expression to that feeling.

The Chairman put the motion, which was carried with applause.

Mr. Holmes: There is a matter to which I think attention should be called at this juncture. This Association has been made very comfortable here, and have been made to feel at home, and I beg to present this resolution: Moved by myself, seconded by Mr. Dickenson, that the best thanks of the Ontario Bee-keepers, in Convention assembled, be tendered the York County Council for the kindness shown in granting the use of this very comfortable room at this time, and to ex-warden J. D. Evans for his kindly words of greeting which have contributed so largely to the pleasure of this Convention.

The Chairman: I am sure you all concur with the mover and seconder of this resolution. We have been amply cared for here for two years, and I think the Association may well pass upon it.

The motion was put to the meeting and carried with applause.

Mr. Laing: I have a motion here I would like to place before the Association. It is: "That the members of the Ontario Bee-keepers' Association, in Convention assembled, place themselves on record as desirous of having demonstrations and lectures in a suitable building at the National Exhibition at Toronto, and other exhibitions, the object being to show forth the natural history of the bee, the methods of obtaining honey, and how to judge and care for honey, and to interest the public in the product of the bee. The Association again asks that experiments be conducted showing what part the bees play in the fertilization of blossoms, such as fruit, clover and buckwheat; and that we would endorse the action taken by the National Bee-keepers' Association at Harrisburg, requesting that bee-keeping receive by

the Federal, State, Dominion and Provincial authorities the same help and encouragement other branches of agriculture are receiving; that copies of this resolution be presented to the National Association, Toronto; the Western Fair Association, London; the Central Exhibition, Ottawa; and other leading exhibitions; also to the Hon. Sydney Fisher, Ottawa, to the Hon. Nelson Monteith, Toronto, and to Mr. N. E. France, Gen. Manager of the National Bee-keepers' Association, Platteville, Wisconsin."

Mr. GRAINGER: I have pleasure in seconding this resolution. It seems to be something along the line of what I suggested in my report; and that would be of great benefit not only to the general public, but to the bee-keepers. If it is an advantage to have the public know all about the bee,—and from the way they ask questions when we are exhibiting there it is remarkable the ignorance they display on matters pertaining to bee culture—if we can do something along this line, and get some help from the Government or some other source to pay expenses, and at the same time benefit ourselves and the general public it seems to me it would be a grand thing. I think if it was taken up in a right way we might accomplish something that would be good both for the public and the Association.

Mr. HOUSE: New York State has an exhibit of that kind at our State Fair, and has had for the past six years, and they consider it a great drawing card to their fair. We also, as bee-keepers, consider it as such in the way of advertising our goods and attracting the attention of the public and educating them on certain points. I believe it is a grand thing, and the more we can get of that, the better it is for the bee-keeper.

The Chairman put the motion, which was carried.

Mr. LOWEY moved, seconded by Mr. HOLMES, that the next annual meeting be held in Toronto, the time, place and other arrangements to be left in the hands of the Executive Committee. Carried.

The CHAIRMAN: We have a paper by Mr. R. H. Smith on "A Chapter of Mistakes," which he sent from the Northwest to be read. We will call on Mr. Couse to read this paper in the absence of the author.

A CHAPTER OF MISTAKES.

By R. H. SMITH, St. THOMAS.

From the title of this paper assigned to me, viz., "A Chapter of Mistakes," one might be inclined to suppose that I had made a greater number of errors than other bee-keepers. While this may be so, I cannot bring myself to admit it. In looking back over my twenty-seven years of bee-keeping experiences it is easy to see what mistakes I have made that might have been avoided, and in this brief paper I would like to point out for the benefit of those who are commencing their bee-keeping career, the mistakes I have made or have known others to make, and that might have been avoided with profit.

When the average person wishes to make a start in bee-keeping, one of the first mistakes usually made is to reckon the profits or results before the bees are secured. My first mistake was to get bees in a wonderful patent hive that had so many traps and contrivances about it that were neither for use nor ornament, but were more useful as hiding places for moths or places in which to deposit propolis. My next mistake was to invent a hive, or rather an improvement on the hives then in use. Perhaps this was not alto-

gether a mistake, as there was plenty of room for improvement; still, at that time, with my limited knowledge of the subject, I consider it a mistake. A plain simple hive accurately made and fitted with a standard size of frame is the best hive to keep bees in, for the simple reason that bees in hives of that description are more valuable when one wishes to dispose of them.

Another rock or mistake on which we were nearly wrecked was in supposing that the more that bees were allowed to swarm the more prosperous we were, while we found that almost the opposite was the case. We had often heard quoted the old rhyme "A swarm of bees in May, etc." Still in the average season in Ontario we found it better for several reasons not to allow swarming (if swarming were allowed at all) before June 15th, and then only to allow a limited number if honey production were the object.

A mistake commonly made is to commence bee-keeping on a large scale without a knowledge of the business or proper equipment. It is better to spend some time with an expert bee-keeper, or become posted in the main principles of bee-keeping, and in that way avoid the disasters common to the inexperienced. I think a bee-keeper is an object of pity if, on a hot day in July he has about 100 colonies which are allowed to swarm, naturally without clipped queens and perhaps few hives ready. He may surmount the difficulty with hard work and get each and every swarm safely housed probably by the end of the honey flow, and to his astonishment and disgust a few weeks later he may find that his swarms have dwindled to a mere handful of bees in each hive and many of them in a state of starvation, when to save them he has to double up to about the same number he started the season with. In the meantime the honey season is past, and our friend has the experience if not much honey.

The queens too, do not receive as much attention as they should have. This mistake often happens that failing queens are kept over from one season to another because perhaps, the bee-keeper has paid a good price for them, or they have done such good work, or are particularly handsome; where, if he had studied the best interests from a dollar and cents point of view, he would have destroyed them at the end of the second or third season, and replaced them with young and vigorous queens.

A mistake commonly made is to suppose that any locality will yield a good crop of honey every season. Some districts are better than others for light honey. Others may give a better return by yielding both light and dark honey in their season. We often hear of good results being obtained in some locality, and we are apt to say if we were only there how much better off we would be. Far off pastures always look green. Perhaps if we were there we might not do as well as at home. There may be as much difference in the bee-keeper, and his system of management or strain of bees would make all the difference.

It is a mistake to suppose that a bee-keeper is saving anything by only providing or using one extractor or section super for each colony of bees. In an ordinary season I would not use less than from two to four supers. When we began bee-keeping we did not use any supers, but made the great mistake, common in those days, of extracting from the brood chamber. I sometimes think it is a great mistake for a bee-keeper to brag about how many pounds of honey he can extract in a day, because if the quantity is large one is apt to think that a large percentage of his combs were not capped, and it is one of the greatest mistakes a bee-keeper can make to extract unripe honey and put it on the market. Not only is the honey of an inferior quality and liable to ferment or sour, but the consumer is disappointed and is not likely to repeat an order.

It has been said that the introduction of an extractor has been detrimental to bee-keeping because some bee-keepers make the mistake of extracting too closely, and often leave their bees without sufficient honey to supply them through the winter months. In the fall of the year many bee-keepers make the mistake of negelcting to see that their bees have sufficient stores, and when cold weather comes in finds it too late to supply them, and so a large percentage die the following winter and spring.

When marketing honey it is a mistake to suppose it does not pay for the time taken to put it up in an attractive form. How often do we see some of the finest honey in sections badly daubed with propolis, and perhaps bulged combs, that are bruised and leaking, or put up in soiled cases. Any or all of these things make a difference of from two cents to five cents per pound. Extracted honey, too, requires just as much attention, and if put up in glass jars, do not make the mistake of using any but clear flint glass neatly labelled and with a tight fitting cover.

This is only one chapter of the mistakes that are made by bee-keepers, and many others may occur to you, but if the mistakes I have mentioned should give rise to some discussion, its object will have been attained.

Mr. Holmes: It falls to my lot on this occasion to open the discussion on Mr. Smith's very valuable paper, and to note errors or omissions; in short, paradoxical as it may seem, I am to discover for our mutual benefit the mistakes in "A Chapter of Mistakes." I believe it will be generally admitted that the Managing Committee did a very noble act in placing that number on the programme, and that they were specially wise when they placed so intensely practical a man as Mr. Smith, of St. Thomas, in charge of it. What do I mean by "noble act?" Simply this: That by the publishing of this chapter of mistakes through the medium of the Ontario Bee-keepers' Association, and accentuated by the discussion following it, a warning, a red light, a danger signal, is placed at the shoals and reefs where, alas! too many have made miserable shipwreck and failure. These are they who have started well, meant well, and with neatly trimmed craft set sail, and all went well for a while, till they struck that first mistake, that sunken reef where all had appeared smooth sailing, and then in the confusion following they struck on other and worse mistakes until the wreck is complete.

A mistake is a wrong act unintentionally done, and a noble trait of character is disclosed in the raising of the warning note. What would be thought of the person who drives into a sink hole or a defective bridge, and breaks his carriage and perhaps maims his horse, and then goes on his way without setting up a danger signal, evidently wishing for the consolation of witnessing a similar misfortune to others? He would be considered a low-down fellow, unworthy of respect, and entirely lacking in the finer qualities which constitute a real man.

The references in the paper to rocks or mistakes on which the newly launched craft may be wrecked or damaged are very timely indeed. The warning is set for the beginner who thinks he can make a better hive, for the carpenter with a temptation. Then the arrival of swarming-time with a free hand and a few hives ready is a good point, deserving of special emphasis. Next, that special danger signal set against extracting unripe honey; an ambitious individual anxious to get there first, but who becomes an object of pity and scorn, as he does injury to his own interest and that of others by placing the thin, unripe article on the market. This red light of warning should be kept very prominent.

The mistake of having too few extracting supers is also noted. The position taken here might be assailed by some who claim that one super is quite sufficient, but in the main it is good advice, as, if in error, it would be erring on the right side.

But, coming to the point, some one has said, "If the storm of adversity whistles around you, whistle as bravely yourself; perhaps the two whistles may make melody," and was it Davie Crockett't advice.

"Remember this when I am dead,
Be sure you're right, then go ahead."

In the midst of all these danger signals so properly set in Mr. Smith's address, it would probably have made a good finish if he had told the beginner that the road to success was marked by a white light supported by a tripod, the legs of which are Information, Imitation and Incarnation. Information sought earnestly and continuously; imitation of those who have done well; and incarnation, the embodiment or example in person as nearly as possible of the noble men in the bee-keeping world, all the way from Rev. L. L. Langstroth, of precious memory, down through the years to this present, who have given the very best of their lives to the study of agriculture, and have them cheerfully and freely handed down to others the knowledge secured at great expense and by long years of patient toil and study.

Mr. Lowey: There was one point I was a little disappointed in, and that is the point of so many swarms without clipped queens. I would like to hear from others who have had experience in the case of clipped queens with that many swarms.

Mr. Sibbald: I would simply cage each queen and leave her at the front of one hive, and keep on at work extracting or whatever I was doing, and let the bees look after themselves, and as a rule they divide pretty well. You might find one or two that get too many bees, but you can shake them and make two or three good swarms out of them. The others will probably divide themselves. If the queens are not clipped they will fly up into a tree and you have two or three hours work over them. If you clip the queens you have the whole situation in your hands; they will separate better to their own brood on the old stand.

Mr. McEvoy: In case six or more swarms come off at one time these will, as a rule, drift into one heap and then in returning they will return sometimes too many to the one. I keep my bees on a single stand, and that is one thing in favor of the single stand. The first one that comes off is allowed to fly out and I throw a canvas right over the next. There will be a great roar underneath that, and they will turn back into the hive, but if I let all these loose at one time I will get into trouble. I like to have the queens all clipped.

Mr. Sibbald: Did you ever wait twenty-four hours to see what the result would be? Just let them go back wherever they like.

Mr. McEvoy: I have had them when there were too many tiered up. I think I had too many bees to be in one hive properly. The other plan works best, throw the canvas over. I would work no other system. Sometimes a lot of these queens need killing. I have had as many as seventeen queens caged. Sometimes it is a case of driving out the queen, that the hive was not in shape for its colony for swarming. I would destroy that queen and put in a new one.

Mr. Sibbald: I wouldn't let the queens loose for a day or two.

Mr. McEvoy: If there are six or seven coming off together would you let the bees go?

Mr. SIBBALD: Let the bees go, but cage the queen.

Mr. HOUSE: I manipulate a large apiary upon the idea of the clipped queen. We have as high as twelve or fifteen colonies in one bunch. We pay no attention whatever to them, only as we pick up the queens and lay them upon the entrance board and go about our business, and it is very seldom we have any mixing done. If a swarm issued about the time one was returning they would possibly turn about and go in; but after they once go out and light, each one will separate and go home.

Mr. LAING: How long do you keep your queens caged?

Mr. HOUSE: That depends on circumstances; usually about forty-eight hours.

Mr. TIMBERS: I would like to ask how you would manage in the case of six or seven swarms that came off at once with clipped queens, one of which happened to have a virgin queen having superseded.

Mr. SIBBALD: They will ball her.

Mr. McEVOY: That queen is going to anchor and hold them.

Mr. HOUSE: You shouldn't have any of these superseding queens in your yard.

Mr. STORER: How do you prevent second swarming all the time?

Mr. DICKENSON: We have been instructed lately that there is a very nice way of overcoming this matter of letting the bees run the bee-keeper by the bee-keeper running the bees. Shake and hive a lot of those bees on a nice day when it is not too hot.

Mr. CHRYSLER: I have been hearing for a year or two at least that swarming was a thing of the past. Now we are bursting out again, and we have lots of swarming, ten or fifteen at once.

Mr. SIBBALD: Because a person has gone through the experience in years gone by is no reason why he can't answer a question that he knows how to answer. I don't pretend to have such a condition; it hasn't occurred with me for some time.

Mr. HOUSE: I have three apiaries that nobody is watching during the swarming season, only as I see them once or twice a week.

Mr. COUSE: The discussion is on mistakes which most people have made. No doubt a person who has had the experience of handling a yard of bees where the queens are not clipped will know how long it takes to hunt 15 queens and put one in each of 15 hives. He won't do much more that day. If he had known enough to have clipped he wouldn't have wasted any time.

Mr. STORER: I have not had swarming for a number of years. I used to have lots of bees go away with the young queen. They won't swarm without a queen, but they will pick up a young queen somewhere and come out of the hive, and off they will go. I clip my queens and keep second swarming down, and so have had no trouble with them. I keep three outyards and know the condition the bees are in. I shake them if I require to. I think I have not lost more than two per cent. of full swarms in a season in each yard.

Mr. McEVOY: To what age do you keep your queens?

Mr. STORER: I leave that pretty much to the bees. The bees have some idea when there is anything wrong.

Mr. McEVOY: You might have six or seven come off at a time.

Mr. STORER: I have seen them when you could shovel them up. I have piled four or five hives up on top of one another, and made a top entrance, and all manner of ways, and the bees settled it themselves.

Mr. McEVOY: Haven't you had some that were too strong in that way?

Mr. STORER: You can always give them room to build up. I never found an exceedingly heavy swarm do much good.

COMB HONEY.

By S. D. House, Camillus, N.Y.

It affords me much pleasure to meet with you; and when I say that after attending the Honey Show that is given in this city, I believe the exhibit to be the best I ever saw, I am saying only a little. (Applause.) You bee-keepers need not send over to New York State to get some bee-keeper to come over here and tell you how to produce honey, for you have as good producers in Ontario to-day as there are in the world.

Your worthy secretary has assigned to me the subject of "Comb Honey." Undoubtedly more has been said and written upon this question than all the other subjects combined in the category pertaining to apiculture. Under such circumstances it would seem almost impossible to add anything to what has been said and written, or to advance any new ideas.

The subject is the broadest and most difficult, as well as the most important, pertaining to our favored pursuit.

The apiarist who produces comb honey, in order to obtain the best results, must be resourceful and capable. He should be a quick and keen observer. He must be intelligent enough to quickly adjust conditions and circumstances.

It is an undisputed fact that there are no established rules or methods that can be followed that would be applicable to every season or to every locality. What is one man's meat is another's poison. Methods that would be successful in one locality, would be disastrous in another.

In this latitude a change in the weather conditions often spoils our plans, and make it necessary for a quick change in operations to meet existing conditions, or we will suffer reverses and loss, perhaps, of a part or all of our season's labor.

First of all then, every apiarist, and especially every comb honey producer, should select a favorable location. Such selection having been made, the bee-keeper should have absolute knowledge of the extent and resources from which he could derive the coveted nectar. He must learn at what times in the season the different bloom, or flora, will make its appearance, and then arrange his work and manipulations accordingly. Many keepers of bees labor under the false impression that all that is necessary is to put on the supers and the bees will do the rest. They cannot understand why they do not get as much surplus as the other fellow. It is hard to enlighten such bee-keepers, and to that class what I may say will be of little use.

You have heard of the odd sayings of bee-keepers of the old school, which might be applicable to this subject at this time. About all they seemed to know of the business was—"A swarm of bees in May is worth a load of hay; a swarm of bees in June is worth a silver spoon; a swarm of bees in July is not worth a fly." Another one was, "No bees, no honey; no honey, no money."

In this age of apiculture, how true those axioms are. Are they not the real fundamental principles for successful honey production? I will take up those sayings to prove their truthfulness, and in doing so, will divide my subject into three parts. First, queens and bees; second, hives and manipulation; third, care and marketing of our products.

First, then, how shall we get the bees at the proper time to take advantage of the honey producing flora when it makes it appearance? In order to obtain the greatest number of bees, we must have young and prolific queens. This brings up to a point of breeding bees, and one of the most

important factors in securing those strong colonies so much coveted. We must have a young queen, bred from a strain known to have great prolificness, whose progeny are good wax producers and honey gatherers. You have observed the great activity of a colony with a young queen; she seems to inspire the whole family with her vigor and youth for greater work. We have been breeding queens for half a century in a scientific way, and as a rule our queens are no better than fifty years ago. Why? Because we have bred more for color and purity of race than in selecting our breeding queens for endurance and prolificness, losing sight of the most important qualifications. In order to attain the greatest number of bees in a colony, we must control, or overcome the swarming impulse. Remember you can do a certain piece of work with a certain number of men in a given time much easier and quicker than you could with one-half the number of men. So with bees. A strong colony will produce more at the right time than two of half the strength. With a young queen we have taken away most of the desire for swarming. Herein lies the secret of success. Do not lose sight of the fact that the older the queen, the greater the desire for the swarming impulse. This is in accordance with the laws of nature.

Starting with a young queen, the next important point is to keep that queen and her colony working to an advantage and to their utmost capacity. Commencing in the early part of April, we have the most critical point where we must exercise the most careful and best judgment in all of our manipulations during the entire season if we expect to be successful. A mistake at this time, or a failure to take advantage of every opportunity offered, greatly diminishes our chance of securing the much desired result.

We must manipulate our hives so as to generate and retain all the heat possible, by contracting the brood chamber to just that size that will keep the queen laying; enlarging it from time to time to keep her and her family busy, and at the same time not to subject them to a loss from sudden changes of the weather. This requires both good judgment and work.

Here is where the hive plays an important factor. Instead of manipulating our apiaries by brood frames and section holders we handle only hives, and parts of hives, and whole supers. By such manipulation, we reduce the cost of production to a minimum, an item that should not be lost sight of.

The most successful producer is the apiarist who secures the largest yield for the time and money expended. One man will handle 300 colonies against another's 100 colonies with the same labor and expense; therefore the hive is a primary adjunct.

The hives generally used are too large for securing the largest possible amount of comb honey according to the method I have adopted. While I advocate a large hive, I wish it to be understood that the hive in general use will not permit of practical adjustment of the brood chamber to conform with modern practice in producing comb honey, and I might say extracted honey.

To accomplish the desired result, I have adopted the devisable hive; not perpendicular, but horizontal; with shallow brood frames about five inches in depth; a movable bottom and top, and all made with perfect joints. In conjunction with this I desire to say that brood frames with heavy, or thick top bars and narrow spacing, is one of the causes for honey being stored in the brood chamber. The top bar should be not more than $\frac{7}{8}$ inches wide and not over $\frac{3}{8}$ inches thick, and spaced one-half inch apart, which will give a free communication above.

Right here I wish to call your attention to one point: never use soiled cloth covering over supers or the brood nest; it is unnecessary with closely fitted joints ,and will obviate the use of propolis. When we do away with the cause for the use of propolis, there will be less of it gathered, and less traveled-stained honey.

With the divisible hive, which consists of two sections during the winter, I proceed from the first to the 10th of April (in my locality) and examine each colony, and note their condition and the amount of stores on hand. I take away sealed honey from those having more than their requirements and give to those short of stores; contracting and adapting the brood chamber to the requirements of each colony. Unless on special occasions I do not open the hive again until fruit bloom appears. Then, by the use of perforated zinc, I find every queen and clip one of her wings. By this time, or perhaps before, my bees will need more room in the brood chamber. This is given by adding another section of the hive. I now have a large brood nest of worker cells built on comb foundation.

After fruit bloom has gone, we should stimulate until clover appears. In this condition they are allowed to increase in strength until about June 10th. By this time we have very strong colonies of bees which are ready for the honey flow, and we are prepared to give comb honey supers, when I proceed as follows: First, remove two sections of the brood chamber, or reduce the hive to one section; and with the use of the queen excluding zinc, we confine the queen to this small or shallow brood nest, one that has the most sealed brood, and as little honey as possible, or an empty super frame filled with comb foundation.

We now add above the queen excluding division zinc, one or more comb honey supers filled wtih sections containing full sheets of comb foundation. Then shake or brush the greater part of the bees from the section of the brood chamber just removed, and place them upon a new stand, giving each one so placed a queen, or a ripe queen cell. After placing on new stands about one-third as many colonies as we intend to shake, we put on to each an excluding zinc. Now the brood that we shake is placed over those first set out on new stands. As the brood hatches, these combs above excluder are filled with honey, and no further attention is given them until after the white honey season is over, when these combs are extracted, and one section of empty combs given to each colony that has produced comb honey, that they may lay up their stores for winter. In about seven days after the colony has been shaken, add another comb honey super, repeating this as often as the honey flow will allow. The comb honey super should be raised about the time the bees commence sealing the honey, thus preventing it becoming soiled or travel stained. This brings us to a close of the honey harvest, unless you are in a locality where surplus is obtained from buckwheat, in which case place surplus super above the two sections of brood chamber. Comb honey should be removed from the bees by an "escape board," as soon as finished, and the supers tiered up, one above the other, as high as convenient, in a room with the temperature not below 70 degrees. From ten to fifteen days later it should be fumigated by the use of bisulphide of carbon. This is done by placing an empty super on top of tiers, using about one ounce of the carbon in a dish placed inside the empty super. Cover with a cloth and allow it to evaporate. Honey stored in this way will keep in perfect condition.

Great care should be taken in cleaning the sections and grading our comb honey.

Many large producers often lower the price of their product through poor judgment in grading and in carelessness in handling. Sections filled with combs that are to be carried over to the next season should be kept from the light and air, or they will not be fit for further use. I have found from experience that they *should not be used at all*, as honey stored in such combs will be only No. 2 at its best.

We should also unite upon a section of more uniform weight. As honey is being sold by the box more and more each season, present diversity of weight gives the consumer unequal value for his money, which causes dissatisfaction and retards consumption.

The sale of our product should be concentrated in the hands of honest, capable business men, which would enable us to maintain more uniform prices.

We should make use of every possible means to educate the people to the use of honey, and one of the best methods of attracting the public attention is an exhibition of honey; making it as attractive as possible. This must be done by the bee-keeper, not only at our fairs and national exhibitions, but we should try to induce the wholesaler and retailer to make large displays in their windows that will attract the attention of the people and tempt their palate to such an extent that they would become a purchaser at once. For an illustration: Last winter after I had given a talk at one of our public schools upon the anatomy and physiology of the honey bee, those students went home and said, "Oh, we must have some honey for supper." The result was that those school children bought every available box of comb honey in town, and there was not enough to go around. The grocerymen in town had purchased their usual winter supply and sold it all in about one hour's time. This is only one instance. We could make it a thousand. We as individuals, or local associations, cannot do it alone. But we should be united throughout the length and breadth of our land. The water that flows over the falls of Niagara only needed man's genius and energy to develop its wonderful power, and when confined and converted, at great expense, for a purpose, it became a profit to man. So with us if we combine our energy for a purpose, we could develop the honey market to an extent that would astonish bee-keepers as greatly as the powers of Niagara have astonished the world.

Wax production might be considered as pertaining to this subject, but as I have already taken up much of your valuable time, I will leave this question for a future time, or for others to discuss, along with the subject of comb honey production. I thank you for your kind attention, and hope I may have been the means of drawing out a thorough discussion of this all important subject.

Mr. ANGUISH: This plan as outlined in the paper we have just heard is mine right to a T. I work on the same principles and systems that he does. I know a good many who raise their comb honey by buying their sections and putting them on this year, letting the bees stain them, and carrying them over. These will be the first ones they put on next year. Mr. House says he does not want any of those. Neither do I. I carry over no sections. My frames are 6½ inches deep: Mr. House's are 5 inches.

Mr. HOLTERMANN: The system and lines along which Mr. House works are not mine in some respects. I visited Mr. House at his home twice, and I do feel particularly proud to-night to think that we at Brantford discovered him, and that you have brought him to the Convention this year. He understands his business, and he can back up all he says, right at his home. I may say he is the taker of prizes at the New York State Fair. I don't think anyone is able to touch him there; he has taken the first prize for thirteen years.

Mr. CHRYSLER: Mr. House speaks of the importance of young queens. Is that of the present year's rearing?

Mr. HOUSE: Yes.

Mr. CHRYSLER: I will endorse that.

Mr. LAING: Do you change the queens every year?

Mr. HOUSE: Yes. Some here would like to know how we get the young queens with this ystem; it is a very easy matter to raise and fertilize these young queens mostly in the hive where they are going to stay. Referring to giving an extra super at the time they need more honey, I would say, at the time there is a section of the hive of empty combs given the colony, place a queen excluding zinc between the two lower sections of your brood chamber and the queen cell in the lower section. The old queen is going on with work that will occupy her time for some days, and the young queen is becoming fertile and commencing to lay in the lower section. It is all done in the same hive and along the same lines. When you lift those cases away you have your young queen there all established ready for work.

Mr. LAING: I don't exactly see the necessity for having these queens one year old. Why not turn in half a dozen queens like Alexander has suggested. Couldn't they do the work?

Mr. HOLTERMANN: Has Mr. House any trouble with swarms when that cell hatches in the lower compartment?

Mr. HOUSE: No.

Mr. CHRYSLER: I had that same thing happen this year, and I had no swarms at all. I was just getting on to that line of work, I think it is the greatest thing, especially for comb honey, or probably extracted honey, too, that we have had.

Mr. HOUSE: Some eighteen years ago, or a trifle over that, we were producing queen cells in the same brood nest with a laying queen, and we did it with a division board of perforated zinc. We changed that queen over from one side to the other. We produced queen cells and cut out the queen cells. This was before we could artificially force them into building queen cells. When we got one side going we would change the queen over; and we were producing queens back and forth. You can do it in any hive by using perforated zinc.

Mr. MCEVOY: You have had two queens laying in the one hive at the same time with an excluder between?

Mr. HOUSE: Yes.

Mr. LAING: Do you mean to say they never get the swarming impulse under such conditions as those?

Mr. HOUSE: If they do they get rid of it some way.

Mr. CHRYSLER: That queen excluder I had, had an entrance to the upper story and the bees would go in that entrance and partly neglect the lower one. I thought that was one reason why they had no idea of swarming.

Mr. HOLTERMANN: You had that condition when the queens were below and no queens in the super?

Mr. CHRYSLER: The queens were above and the brood below; and they had an entrance below and one at the queen excluder where the queen was.

Mr. MCEVOY: Have you had two queens laying at one time?

Mr. CHRYSLER: Yes, I have had one old and one young queen.

Prof. SURFACE: I would like to ask Mr. House as to his treatment of unfinished sections?

Mr. HOUSE: We don't have any unfinished sections when we get through with the season. That is why I found it was not necessary to use any old bait combs. Force the bees to fill the section.

Mr. ANGUISH: That is the point. Have no unfinished sections. You want to look ahead far enough to try not have any. There may be seasons when you have them. We expect a flow of honey, and do not generally put them on till we know it is on. Take it when there is a four or five pound a day flow for a week or so, you can get your sections pretty well finished. If you do not you can pile them up on one or two or three or four colonies, and feed with some sort of a feeder from underneath. Liquefy your honey thin with water. You have then got a flow for a month or two months if you want it. That is the way to finish up unfinished sections. When the end of the flow is coming in sight we will take off the comb honey supers as soon as they are finished and put on the extracting supers again and finish out the balance of the season.

Mr. LAING: Do you do a little feeding back to finish those up?

Mr. HOUSE: I have done such a thing.

Mr. LAING: In feeding back I understand the custom is to thin the honey down a little bit. How do you handle that? What percentage of water?

Mr. HOUSE: The honey should be made about the consistency of nectar, about one-fifth water added.

Mr. ANGUISH: It is impossible to raise good comb honey on the deep frame; there is always a little rim of honey along the top bar; and with the shallow frame the brood is right up to the top. We do not want honey in the brood nest; we want all the brood right up to the top bar. When we get through in the fall of the year, if the honey season drops off short, we have got to resort to feeding. If we can get 25 cents a pound for comb honey, and can buy sugar to winter our bees on for 4½ cents, isn't there a little in it?

Mr. HOUSE: With these young prolific queens they will occupy these brood nests continually, and as long as the honey is coming you can leave those supers on. The very honey that you would get ordinarily in your brood chambers for winter stores they will put into that super and finish up your sections, and leave your colony minus of any honey whatever. Hundreds of them were stripped this summer, and they hadn't honey enough to live twenty-four hours; but we can buy sugar and feed for winter stores or feed honey back, if necessary. I consider sugar syrup better to winter upon.

Mr. ANGUISH: You do not want a big lot of wood for them to pass over to keep warm; you want a thin top bar.

Mr. CHRYSLER: I can do without a queen excluder if I have a ten-frame width instead of eight. I think I have an advantage there in the way of pollen being stored. It does not go up into the sections.

Mr. HOUSE: In producing 2,000 sections of comb honey this year all the sections that had pollen in went inside of one shipping case.

Mr. HOLTERMANN: Don't you think locality makes a difference on pollen.

Mr. HOUSE: I think not. I depend somewhat upon the queen excluder making a difference.

Mr. ANGUISH: I began hiving on starters, and when I was using them the bees would carry the pollen up into the comb honey. But since I have used full combs I don't think there will be a dozen sections of pollen in a thousand sections of honey.

Mr. HOUSE: You will get the same result by putting one empty comb in the centre and hiving the colony upon this and empty foundations sheets.

Mr. LAING: I would like to ask Mr. Anguish in reference to his combs in the brood nest. Do you take particular pains to get new combs or use combs that are two or three or four years old?

Mr. ANGUISH: I try to keep my combs as new as possible. I keep adding new combs as much as possible, and I keep drifting the older combs off into the extracting supers.

Mr. LAING: In the discussion of my paper they spoke of the soiling of the comb honey from the bees working on old black combs below, and you having had more experience than myself, I thought you would have noticed it very materially if it was right.

Mr. ANGUISH: When comb honey is produced, if it is not produced middling fast, they will stain it some anyway, even if it is new comb; they are travelling over the brood all the time, and they use the same cappings all the time.

Mr. HOUSE: This evening I have been requested to say something about the supers I use, and the separator. I am very sorry I have not one with me. Some one wished to see the super I had at Brantford. I think my friend Holtermann has a few like them. The separator is a wire cloth separator; it is the coming separator. It will soon be that you will not see a wood separator. The wire cloth separator has come to stay. It has been in New York State for twenty-three years. It is only mine by adoption. It was invented and patented by Mr. Betsinger, of Marcellus, a very ingenious man. This separator has this advantage over all other separators, namely, a free communication of bees and heat between the boxes. It is composed of wire cloth, I should think about 1-18 inch wire, $\frac{1}{4}$ mesh. The separator is bound with tin on all sides, and on the upper side it projects so that it hangs into the grooves or rabbetts on the end of the super. On the lower corner the binder comes down and opens so that it forms a spacer. The sections go into broad frames that hang. Everything hangs—the section holder, the separator and all—and as the lasts section holder goes in that wedges them all. You can go up to your super at any time and there is no propolis sticking down that you need a crowbar or jacknife to raise it up. While you are getting up one of the old style separators I can go through 100 hives. This super has a longitudinal passage and the bees can go all around it; and all the bearings it has are the four points of the sharp edge of the tin as it bears against the separator and spacers. The sections have no bee-way. We can clean about five sections to the ordinary one. About a year ago the Root people spoke in their *Journal* about brace combs. We think so little about brace combs that we would not take the pains to heat a knife to cut them out.

Mr. ANGUISH: Have you section holders with wood underneath?

Mr. HOUSE: Yes.

Mr. ANGUISH: I don't use any. I have my sections come down to the bee space.

Mr. CHRYSLER: I raised 400 sections this year, and followed Mr. House's plan as near as possible with those separators; I believe they are ahead of anything I have tried. As regards sections being fastened to the separator with burr combs. I found that was altogether owing to the way the foundation was put in the sections. If it is loose in any way it will sway. I don't know what makes it sway. I fasten my foundation all the way round.

Mr. SIBBALD: How do you fasten your foundation into the section?

Mr. HOUSE: I have in years gone by used what we call the Daisy fastener. Never put your foundation in the boxes until they are ready to go on the bees that day. I have found it pays to do this. We make our sections, and put them in our frames and in our supers, and store them out of the way without any foundation. As the time comes along that we need these supers we take one of these broad frames out that have three sections. They are

secured with a thumb screw at the back perfectly true, and are laid upon a little board. Then put in the foundation. Here at your side sits a little oil stove with a piece of tin upon a wood handle, that is very hot. Give it a downward motion about three times and the foundation is in. That is fastened on the top. I have tried putting in foundation in the bottom, but if you have colonies of the proper strength you need not bother with any lower foundation; they will bring it out to the wood all right. I allow nearly a quarter of an inch space below. I would not want a full sheet; there is a little gain.

Mr. GRAINGER: What about the side?

Mr. HOUSE: Most of my foundation has been about one-sixteenth narrower than the box.

Mr. MCEVOY: What about wax?

Mr. HOUSE: I want the foundation as it comes from the mill. I don't want any kiln-dried foundation for the hive. That is soft foundation.

Mr. SIBBALD: I have found that very true. The bees do not like foundation that has been put in the sections and stood in the air a long while. They reject it.

Mr. GRAINGER: I heard it stated at a convention some time ago that although foundation might be a year old, by warming it up or steaming it it could be made as good as ever.

Mr. HOUSE: Foundation that becomes hardened from exposure to the atmosphere can be dipped in hot water at about 130 degrees temperature; and you must go to the pains of drying it again and packing it up, but you can make it pliable.

Mr. MCEVOY: How do you fasten foundation in section boxes.

Mr. ANGUISH: I fasten mine about the same as Mr. House does, but on three sides. He is running 500 colonies and we are running about 200.

Mr. NEWTON: Every bee-keeper will say that the bees work more readily on the new foundation.

Mr. MCEVOY: I have used both white and yellow wax, and I don't like the yellow.

Mr. NEWTON: When you are showing at Fairs, I believe the section honey looks nicer, if we can hold it up to the light and it has white wax in the section.

Mr. ANGUISH: What are we showing at the Fairs for? Does nobody use that honey after we get through with it? We have somewhere about 5,000 pounds of section honey, it is all made on white wax. We have only shown a few dozen. What are we going to do with the rest? I want the very best of everything I can get. There is nothing too good for the people that eat the honey.

Mr. HOUSE: I don't know what people mean by having dark wax in section boxes. I have been very fortunate in my operations. I have never experienced any of that. You take any pure yellow beeswax, and when the bees get through with it and are filling out comb with it, it is white. If it is not, you have got something that is not beeswax.

Mr. SIBBALD: I noticed one point in the early part of Mr. House's paper that was not criticised, and which I thought was a very good point. Some people say they use one certain method and some say they use another certain method and so on. Mr. House brought out the thought that we ought to adapt ourselves to circumstances, and be able to size up the season and the condition of the bees, and then adapt a system that would work all right for that season. The system that works this season might not be the system that would work as well next season. You have got

to be ready to work to get the very best results from what you have got. That is a point I was pleased to hear him bring out. I think it would be well for bee-keepers to remember it.

A young queen is a splendid thing for comb honey, and the way he raises those queens is another splendid idea. I believe it will be a great success. I feel like moving a vote of thanks to Mr. House for that valuable paper and for the valuable information he has given us since he read his paper.

Mr. McEvoy: I second the motion.

The Chairman: I am sure the members present have drawn great pleasure and profit from this paper containing so many valuable points. I think it is an exceedingly strong paper. I think it is quite proper that we should extend a vote of thanks to our neighbor from across the line. The motion was carried with applause.

Prof. H. A. Surface, Harrisburg, Pa.: I bring you greetings from your brother and sister bee-keepers of the Keystone State. I shall not attempt to speak to you from the standpoint of an expert bee-keeper who has has been taking prizes for years and years, but rather from the standpoint of the professional naturalist who has been making a study of bees commercially in their relation to the very important subject of horticulture. I know very many bee-keepers are fruit growers, and I know comparatively few fruit growers who are bee-keepers. I fear that the horticulturists themselves are not taking such an extensive interest in bee-keeping as they might. I know some persons in the State of Pennsylvania who are fruit growers who have scarcely the time to go at bee-keeping, and who have put bees in their orchards and have given the product to their neighbors, for the very purpose of having their orchards fertilized by the little bee. Our bee-keepers are exploding the old ideas and theories about the bees puncturing the fruit; we are getting pretty well past that sort of thing.

AN IMPROVED WAX PRESS.

By H. G. Sibbald, Claude.

Every up-to-date apiarist should have in his equipment a good wax press, and should know or understand how to melt up old combs and extract as nearly as possible all the wax from them. Wax is a valuable by-product of the apiary that might with great profit receive more study and attention.

Many combs are unfit for use. Old musty, mouldy, pollen clogged combs, irregular crooked combs, combs having an excess of drone combs, diseased combs, containing the stain marks of foul brood or infected honey, burr combs, scrapings of the hives, frames or sections, broken combs, etc. All these should be condemned to the pot, put through the melting, squeezing, cleaning process, and made into clean cakes of yellow wax, ready for sale or to be made into foundation and transformed by the bees into straight fresh combs, a thing of beauty and usefulness instead of an unsightly mass of germ-producing, moth breeding filth.

I have already referred to the diseased combs. Foul brood would never have made the headway it has, or be considered the scourge it is, if old suspicious combs were valued less as combs and foundation appreciated more. Bees like to build comb, there is a natural secretion of wax, and there is not nearly the distance most people think between the sheet of foundation and the drawn comb.

Outside of the number of bee-keepers who attend conventions and study journals, there are vast numbers who throw away their discarded combs, bury them, or burn them. They have not got a wax press, and cannot believe that any wax can be obtained from them. How foolish this is, and what a loss! After last winter's heavy losses hundreds of combs were left uncovered by the bees, a prey to moths, mice, and insects. At one place I found a snake coiled up amongst the combs, evidently enjoying the honey or waiting there for mice or insects. At one of these deserted villages, containing probably 30 or 35 hives of combs, my assistant secured the lot and melted and extracted 100 lbs of wax which was sold for $35. An average Langstroth comb will yield from ¼ to ½ lb. of wax, and ten Langstroth combs from 3 to 3½ lbs. Surely then it is profitable work melting them, and worth the learning how to use a good press.

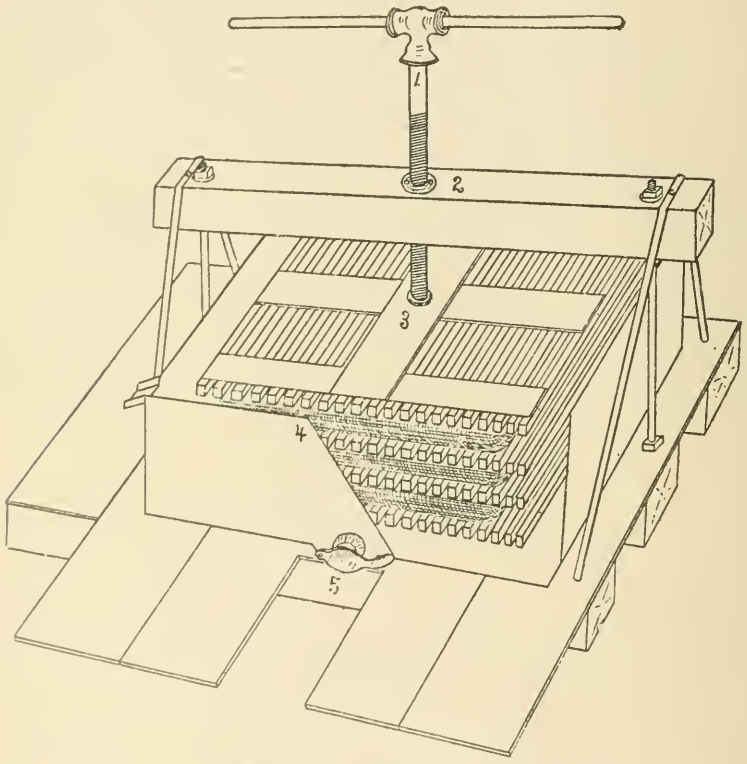
The press I have here is of the Hatch-Gemmel type, and incorporates the Hershisher principle, and the combination makes a better press. It is not my intention to manufacture any for sale so you will excuse me for saying it is the best, giving splendid satisfaction, both as to speed and ability to extract as nearly as possible all the wax.

Before commencing operations, it is necessary to have an ordinary stove, one or two common boilers, two large dippers, a number of sap pails, or vessels to contain the wax, also a tub to hold the water after pressing, a pair of gloves to handle the hot trays and cheeses, six cheese cloths about a yard square each. Start the fire and heat to a boiling point two or three pails of water, draw the tank forward on the platform from under the screw and top bar, so as to get at the trays of slats. Pour this hot water over all so as to heat them thoroughly, fill the boiler about two-thirds full of water again, and as soon as it nears the boiling point fill in the combs to be melted. Mix with a dipper and add combs until the boiler is filled, draw off the water from the tank, remove the trays of slats leaving only the bottom set, on this place the form, spread a cheese cloth over this and commence dipping, skimming from the top where the wax cocoons or the slumgum will be the thickest. When two inches deep have been filled into the cheese-cloth fold it over and pin the ends over, remove the form and we have a bag of hot wax slumgum, called a cheese, lying upon the slats. Another tray is quickly placed on top of this, the form again returned, another cheese cloth spread over and filled as before.

This operation is again repeated and our third cheese formed. The last tray is placed on top (the one with the bug irons on). The tank and contents are pushed back under the top bar, the screw turned down until it commences to press, then the balance of the hot water is poured through a wire cloth strainer into the tank filling it overflowing or submerging the trays of slats, cheese, wax, slumgum, etc. All is under boiling water which is up nearly to the overflow lip. Now give the screw a few turns and see the yellow wax bubble up. Cover the tank with two boards to retain the heat. Turn the screw down again, then slacken to allow the water to go back into the sponge-like slumgum press again, thus washing out the wax. It can get out any way sidewise or endwise, upwards, and once out it cannot soak back, it rises to the surface, and only hot water goes back when the screw is slackened to wash it out cleaner and cleaner. A half hour of this process of wash and press will bring out all the wax, and we are ready for skimming off the wax. This is done by adding fresh boiling water from the second boiler or kettle until the wax will overflow at the lip into a pail there for the purpose. A little skimming with a thin board towards the lip will help to clear it off. Open the tap, and the water flows into a tub below,

still hot and ready to use again. By this time if we have been attending to to the boiler and stove another lot is ready. The tank is again drawn forward, trays and cheese removed and filled again, the second set of cheese cloths being used this time, thus saving dumping the sediment from the others until the pressing is again under way.

Never fill the cheese cloth too full. Try and not have too much water in them. It makes them flabby, and they are apt to roll out of place. Have everything ready so that the work can be continued quickly. Keep everything hot. Two can work to better advantage than one. Never let the trays cool while using. Keep the hot water on them until the next lot is ready. If the wax is run into the tall narrow vessels and placed where they will cool slowly, the sediment will settle and can be scraped off the cake when cool, and is therefore clean and ready for market.



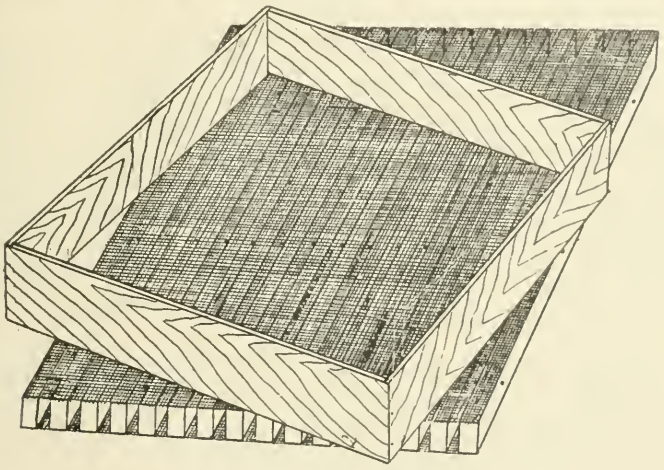
Improved Wax Press, devised by H. G. Sibbald.

The illustration gives a very good idea of the wax press. The frame should be very strong in order to stand the immense strain upon it when in use. The screw should be at least 1¼ in. (1). Top bar of frame (2) should be made of hardwood and be at least 4 in. by 4½ in. by 2 ft. long; the nut for the screw countersunk into the bottom of the hole bored through the centre of the bar.

The platform (5) is made by using three pieces of scantling, hardwood, each 2 x 4, 2 ft. long, boring two holes through each near the ends for the brace irons to go down through, these being secured or fastened by a nut on each, making the platform frame 2 ft. square and 11 or 12 inches below

the bottom of the top bar. The iron braces are made of $\frac{3}{4}$ in. round iron for the upright braces and of $\frac{1}{2}$ in. round iron for the corner braces which are flattened a little on top of the top bar and fastened by a screw-nail. The flooring of the platform is simple, two boards being left extended in front 10. in. to support the tank when drawn forward to fill or empty, the centre board being short so as to allow the water to be drawn off before bringing the tank forward. The tank (4) is 19 x 19 in. x 10 in height, 9 in height to the overflow lip, with a tap in front at the bottom to let off the water and might be made of galvanized iron or heavy tin.

4 sets of slats are necessary and are made of hardwood, $\frac{7}{8}$ in. board ripped into $\frac{3}{4}$ in. pieces and cut 17 in. long. 3 $\frac{1}{4}$ inch holes are bored through the edge of each of these and an iron rod $\frac{1}{4}$ in. 17 in. long used to hold the tray of slats together. 16 strips are used in each tray and if drawn on tight having the holes a little small for the iron, they will stay spaced out. The bottom set are covered with wire cloth on top, two sets covered on both sides and the top set covered on the bottom side only. This is to protect the cheese cloth, the wire being tacked on the slats.



Frame for making moulds, and slats for use under screw.

The top set of slats must be well ironed. Use three pieces of old steel wagon tires and a piece of steel $\frac{1}{4}$ x 4 in. crosswise of these for the centre, shown in the cut. A temporary form 16 x 16, 4 in. high (6) is made of pine and used to get the cheeses in form.

Mr. Laing: Don't you find danger of the cheese-cloth breaking on the sides?

Mr. Sibbald: I melted 600 pounds of wax, and I found the cheese-cloths whole when I got through. We don't fill the form right full. I would not fill it with more than about two inches of thick slumgum to start with. That will go down to about half an inch in the cake. When you take out your cheeses there is none of that stickiness. You don't have to rub or scrape them the way you do the others. Cheese cloth is much preferable to burlap.

Mr. Byer: Do you not have to be careful about pinning these sacks? If you didn't, the slumgum would sometimes burst them open.

Mr. Sibbald: When we started at that, first we dipped too much water in, and that made a sort of flabby thing, that when you took the form out it would burst. We found by being more particular to dip it thick we could keep it in the form better.

Mr. Holtermann: I made a bag and I use that altogether now.

Mr. Sibbald: You don't need anything better than these cheese-cloths. After we have skimmed off the wax, we let the water out from the tap into a tub sitting down below. If there is a little wax in it, it doesn't matter, because we intend to use that water for the next boiling.

If you have a Hatch-Gemmell press all you have to do is to change it into this, and you have a better press. The water is left in the tank until you are about ready to take the next off the stove, and then your slats are all hot. We have all ready for another set of cheese cloths. Put the slats right back in again, have it filled in a few minutes, and press it again. The only way we thought we could improve in the matter of speed would be to have two presses. The one boiler would do the work.

I run quite a little bit of wax over again. I don't use any acid. The customer that takes most of my wax asked me not to use acid. Mr. Newton knows about the color of this wax. This year we melted 600 pounds out of this press, and it was all about the same.

Mr. Newton: I feel pleased this morning to think I was the one to make the motion that we would hear Mr. Sibbald before our meeting closed, because I have heard something that has been of great benefit to me, and to all the members. I have tried different ways and have been discouraged a good many times over the Hatch-Gemmell press. I have confidence from what I have heard to go on, and I will have success in the rendering of old combs and slumgum. I am sure the thanks of this society should be given to Mr. Sibbald for the way he has explained his method to us, and I will move, seconded by Mr. Holtermann, that a cut of the press be placed in the annual report, together with the explanation.

Mr. Dickenson: I think this wax press will overcome the difficulty of taking out pollen.

Mr. Deadman: I have been very much interested in this wax press. Although that is the best thing I have ever seen, and it will surpass all other presses, I believe the day is coming when wax presses will be superseded by something better. In connection with drugs they used to depend on presses for taking out the strength of the drug, but now they force it out by percolation. The difficulty with wax is to get something that will force the wax out of the slumgum. If you can do that the problem is solved.

Mr. Timbers: I am sure we have all been interested and profited by listening to Mr. Sibbald's demonstration, and if we follow out his directions it will more than pay us for the expense we have been at in coming to this Convention.

The Chairman put the motion, which on a vote having been taken, was declared carried with applause.

BEES AND THEIR RELATION TO HORTICULTURE.

By Prof. H. A. Surface of Harrisburg, Pa.

It is to me a great pleasure always to meet with persons practically interested in subjects which I am trying to study, both from a theoretical and practical standpoint. It has been too long, indeed, that practical men

and so-called scientific or theoretical men have stood aloof one from the other. The theoretical scientist needs the aid of the practical man to put him straight. Theory that cannot stand the test of practice is not very stable or accurate, and is not very good science; it is pseudo science or false science. In this day of advanced thought and study and educational methods, we are where the practical man cannot make progress without reaching forth his right hand to join the right hand of the scientific man and make use of scientific principles. Our laboratories prove that instead of the scientist working as did the old alchemist, simply to change the colors of substances, he is working towards a definite end; and so with agriculture, in all its branches, apiculture being one of the minor branches. The practical man is becoming to some extent a scientist. You talk about your queen breeding, about the development of your apiaries, and the selection of your stock, and in doing so you are applying the very principles of advanced stock breeding. Along that line, were I to present a discussion of apiarial improvement, I should insist upon one point which the bee-keeper has apparently overlooked to a great extent. In the breeding of live stock those who are making a specialty of cattle, sheep, hogs, horses and even poultry, give great stress to the importance of the male ancestor in breeding. In fact our cattle breeders lay more strees upon the importance of the male, and the parentage and lineage of the male, than of the female. The horse breeder does the same. How has it been with the bee-keeper? We have thought a good deal about the ancestry of the queen, about the race and the strain, etc., and very little has been said of select drones. Why? Simply because we know the queen mates when flying high in the air, and it is possible to control the parentage of the queen without so readily controlling the parentage of the drone. But nevertheless, what one can do in his apiary is to prevent drones being reared from those hives or colonies that are not as profitable or advantageous or meritorious hives, and in that way he can produce a select strain of drone cells and a select queen.

Now, my experience as a practical bee-keeper has been considerably limited, and I believe from what I see here that were I to present my paper upon "Home Apiary Improvement and Honey Production" I should not be doing the subject the justice that one of your own bee-keepers could do it. I have brought, therefore, a paper upon the subject of bees and horticulture, and it may be I can, through the *Bee Journal*, if desired, publish one upon "Apiary Improvement." With your permission I should prefer to change my subject to that of "Bees and Horticulture," because this is directly in the line of my profession. I have been a student of this subject for practically all my life. I feel more at home in talking upon this than upon the subject of "Apiary Improvement" to expert bee-keepers. Were I speaking to amateurs my attitude would be different.

In attempting to discuss this subject we realize that it is one of the most time-honored among bee-keepers and fruit growers, and that it has been threshed over and over again in journals and meetings devoted to the interests of persons engaged in such pursuits. However, there is sometimes justification in revolving old subjects under a new light to see if perhaps an additional point concerning it can be gained. The very antiquity of the subject indicates is importance, and if anything whatever new can be added, or anything in doubt can be cleared up, and the truth emphasized, we shall be justified in again turning discussion toward the old topic. If something really new be desired, we should be glad to discuss such subjects as "The Bee Sting Cure for Rheumatism," which must no longer be regarded as a

joke, but in line of recent developments becomes a reality; or it might be possible to take up the subject of some unsolved problems, such as "The Effects upon the Human System of Continued Stinging by Bees," "The Results of Rearing Bees in Cells of Different Sizes or Shapes," "The Probability of Spontaneous Production of Wax Flakes and Consequent Loss of Honey by this Transformation when Drawn Comb is used for Storage and the Wax Flakes can not be Utilized," "Multiple Queens," and other topics that may be of more or less practical or scientific interest to bee-keepers.

In discussing the subject of "Bees and Their Relation to Horticulture," we shall refrain from touching the now well-established fact of the definite relationship between bee and flower, the necessity of the bee to obtain both nectar and pollen from the blossom, its wonderful adaptions of structure as shown in the nectar sac and pollen baskets, especially fitted for their purposes, or, on the other hand, the dependency of the blossom upon the bee for the carrying of the pollen grains from stamen to pistil, particularly in going from one flower to another, so essential in cross fertilization and the setting of roots. However, concerning the last point, we may pause long enough to say that this year we have evidence that the general shortage of the plum crop was due to the very cold weather of the spring time, when the plum trees were in blossom, but the bees did not fly. It is possible that the reduced pear crop over the country may be due to a similar cause; but this can not be true of the apple crop, and we know where there was a magnificent yield of apples, in some regions of Pennsyvania, from blossoms that were expanded when it was too cool for bees to fly, and from our own observations we believe that many of the apple trees laden with fruit in the fall of this year were not visited by a bee or other pollenizing insect during the time of their blossoming in the unusually cool spring. We must acknowledge that while in Nature there are most beautiful structures and adaptations, such as the color, form and products of the blossom, to attract and sustain the bee, and pollen sacks, and numerous hairs for the carrying of pollen, as well as nectar sacks for carrying liquids by the bees yet the full relationship of insects and flowers has not been demonstrated by practical test of trees and plants of different kinds, definitely covered with gauze or very thin netting in such a way as to permit the natural vital functions of the plants to take place, with the possibility of wind fertilization, but excluding pollenizing insects entirely from the trees or plants of different kinds. Such studies could be well made by our Experiment Stations, and would no doubt reveal the fact that some kinds, like plums are more dependent upon the bees than are others, like the apples. The student of nature constantly meets so many beautiful and wonderful facts and conditions that he may possibly fail to appreciate their full significance, but occasionally in the contemplation of such things he is forced to pause and exclaim with the poet Young:

> "No more the misty vale of doubt I trod,
> My reason saw, my Soul confessed a God."

In this following discussion I wish to place emphasis upon the three following points: (1) Bees will not be killed by proper spraying methods; (2) Bees do not and can not puncture fruits; (3) Bees are not to be condemned for carrying the germs of pear blight. These I shall discuss in detail.

(1) Bees and Spraying. This subject has been discussed to such an extent that we should consider it fairly well settled, were it not for the fact that frequently articles appear in the papers and are circulated over the country, conveying the information that bees have been killed by spraying, and even in some cases going so far as to say that honey has been poisoned by

the use of spray liquids containing poison carried to the hives by the industrious workers. In passing, we wish to pause only long enough to go on record as having said that we consider the production of poisoned honey from sprayed plants as an impossibility, and such a suggestion an injustice to the producer and also to the consumer of the most delicious of human foods.

While it is now generally recognized that spraying blossoms is such bad horticultural practice from the standpoint of the fruit producer, that it is not followed; and consequently the danger of killing bees at such time has passed away, we have a new hoax to be found in the statement which was received extensive circulation during the past spring to the effect that spraying for the San José Scale has killed bees. It appears constantly that either some bee-keeper is to be disgruntled over modern horticultural practices, or some fruit grower is anxious to assume a postion of enmity toward a bee-keeper for some fancied wrong by bees. This is like a farmer who must necessarily find cause for complaint. It must first be poor crops, but when these yield more, he then complains of low prices; but when crops are good and prices are high, as during the present year, he still finds solace in being miserable over the fact that. "It takes lots of work to harvest and market such crops, and besides it's awfully hard on the ground." (Laughter.)

The following article was extensively circulated in the papers of Pennsylvania during the past spring:

TREE SPRAYING KILLS BEES.

Thousands of Insect Honey Hunters Die from Sipping Poison.

Tree spraying for the San José Scale now being conducted at the instance of the State Agricultural Department has aroused the displeasure of the keepers of bees in the vicinity of Norristown, owing to the havoc it has created by killing thousands of these honey gatherers. Probably the heaviest loser is John C. Detwiler, in Whitemarsh, who says that his bees have died by the thousands since the trees in the neighborhood have been sprayed.

Mr. Detwiler says: "Bees require large quantities of water, especially at this season, and will obtain it from almost any blossom or wherever possible. This water is then mixed with the pollen in process of keeping the hive. At present bees are feasting upon the opening blossoms, and almost as soon as they sip therefrom, the trees of which have been sprayed for the extirpation of the San José Scale, they become affected by the poisonous liquid and speedily die."

To this we felt obliged to reply as follows:

BEES AND TREE SPRAYING.

State Zoologist Says Sulphur Wash Kills the Scale but not the Bees.

My attention has been called to a newspaper article entitled "Tree Spraying Kills Bees," and I beg to write concerning the error in this, as it is an injustice to the men who may wish to save their trees from the terrible San José Scale. In the first place, the spray for the San José Scale must be applied before the trees are in bloom, and our inspectors and demonstrators have never sprayed any trees while in blossom in order to kill any scale insects; therefore there would be no honey bees around the trees sprayed for San José Scale at the time the spraying was done. The lime-sulphur wash is caustic, but it is not a "poisonous liquid." Bees could not be induced to sip it, and if they should do so they would not be killed by it, as they would by an arsenical poison.

The bees around Norristown, as elsewhere in this state, may be dying from foul brood or a trouble sometimes called "spring dwindling" but they certainly are not killed from the effect of any spray used or recommended by this office for San José Scale.

May I take this occasion also to call the attention of the public to the fact that we do not spray blossoms for any pest known. In other words, no trees should be

sprayed while in bloom. Spraying at such times with arsenical poison may have the effect of killing bees, but the lime-sulphur wash is not an arsenical poison, and is not sprayed while the trees are in bloom, and therefore bees are not killed by any spray used for this purpose."

H. A. Surface,
Economic Zoologist of Pennsylvania.

For San José Scale, fruit growers may use oils, soaps, or caustic washes, such as the lime-sulphur wash, which we consider best and cheapest. The bees would not touch the soap solutions nor oil substances. We have had a kettle of the lime-sulphur wash standing near our bee hives for weeks, and not one bee has been seen to attempt to drink it nor have any been killed by it. We have sprayed bushes and trees around and over the hives during the past year, and have had the hives covered with the spray in an experimental orchard, two or three different times, to such an extent that they were yellow in color, and the liquid dripped from them. None of the bees were killed by the process excepting those that were accidentally injured while actually in the act of flying through the cloud of mist or spray as it left the nozzle. A few of these may have been killed, but if so it was only by external contact and not by their voluntary sipping the liquid.

It is to be remembered that in making such a statement a professional naturalist values his own scientific reputation too highly to permit himself to make an error that can be avoided either by practical test or by careful study. We are certain that bees have not been killed by spraying trees before they blossom, and no one sprays for the San José Scale after the buds burst. In general, no fruit grower, who knows how, when, and why to spray ever sprays anything while the blossoms are open, and this is the only chance by which bees could be killed, excepting in the rare conditions of bees being quite thirsty and deprived of their natural water, sipping a little spray liquid from the leaves where it may remain for a short time after spraying for the codling moth or leaf-eating insects later in the season.

Emphasis should be made of the fact that the Bordeaux Mixture is not an insecticide, would not kill bees nor other insects, and is used only as a fungicide or preventive of certain plant diseases. If, however, Paris Green or some other arsenical poison, such as London Purple or Arsenate of Lead, were added to the Bordeaux Mixture or used as a spray, and the bees could be induced to sip the liquid through its falling into widely opened nectar-yielding blossoms, or through excessive thirst of the bees, sipping it from the leaves where it temporarily remains, it is possible that these beneficial insects might be killed by such means and at such times. However, it is my opinion that if water be placed in the apiary regularly, as it should be, the bees will learn to go to it, and will not seek the drops of poisoned spray liquid that may remain temporarily on the leaves in spraying for the codling moth. Finally, on this particular point it may be said that the codling moth is the only pest for which arsenical sprays are recommended as a regular annual practice, and for it the spraying should be done soon after the petals fall, and again within a week or ten days. But few bees are flying in the tree tops at such time.

Though it is fairly well known that bees do not puncture fruits, yet further observations and proofs are needed to convince some persons on this point. Not long ago a friend reported to us that our bees were puncturing and destroying his grapes. I sent an assistant to investigate this and he reported to me that the bees were in the grapes, but were sipping the juices only of those of which the skin was punctured, either by the Grape-berry moth, the Curculio, Yellow Jackets, or the Brown Rot germ. They are unable to break or puncture the skin of grapes of their own accord.

Last summer I found a few bees sucking the juices and removing the pulp from beneath the skins of plums hanging from a tree over their hives. To test the ability of the bees to work at very small punctures and make punctures for themselves, I placed six plums on an old pan and set this on the frames in the top of the hive. I here exhibit the same after it had remained there nearly two months, and in fact was taken from the hive no earlier than the thirtieth day of last month. The two plums marked "A" were starting to decay with Monillia or Brown Rot; the two marked "B" were sound and ripe and were placed on the pan with their skins unbroken; the two marked "C" were merely punctured with four or five direct pricks of a pin in each. It can be seen that the bees removed the juices and pulp of the last pair because they could find working points at the punctured places; but the second pair, or the unpunctured fruit, simply dried like prunes, without the skin having been broken by the insects, and with the pulp left in place. The first pair, or those starting to decay, received some attention from the bees; but in my opinion they worked only upon that part of the fruit which had not yet decayed, finding their entrance in the skin at the edge of the decayed area. An examination of the reverse side of this pan shows the propolis, which plainly indicates that it has been for some time on the frames of the hive. May we not accept this as one of the evidences that bees do not ca se the original injury to fruits which they visit?

Concerning bees carrying the serious and deadly germs of Pear Blight, I wish to establish this that Pear Blight often appears without the intervention of bees, and that as these are not by any means the sole agents culpable for the dissemination of such germs, the pear growers are not justified in condemning the bee and desiring to exclude it from their orchards. We know that such action has been contemplated, as I was recently told of it and of the effort made by some fruit growers in California to condemn and prohibit the keeping of bees near their pear trees, because they presumed these insects were the agents responsible for the spread of the Pear Blight. Mr. E. R. Root, of Medina, Ohio, went with them through their orchards, and showed them ants and other insects present in numbers upon the trees. He convinced them of the possibility of the Blight germs being conveyed by these other agencies, and hence the impossibility of preventing its spread should all the bees be excluded from their orchards.

An illustration of my meaning in this regard is to be found in the attitude of some fruit growers toward the Robin Redbreast or American Robin. Some persons have raised a cry against this bird, demanding legislative proceedings for its destruction, because they claim that it carries upon its feet the deadly San José Scale, so destructive to most fruits. The facts are that the San José Scale is carried or disseminated by eight or ten other means besides upon the feet of birds, and in the last-named agency the English Sparrow is far more effective as an agent in the dissemination of the San José Scale than is the Robin. In fact, any bird that would alight in a tree, infested with this scale insect in its young and free-moving stage would be liable to carry the young pests upon its feet to any other place to which it might fly. The robin is only one of the known agencies in spreading the scale, this pest being carried by so many other means, so that the cry against it for such reason is not justified; and the spread of the scale would be practically as rapid and extensive were all the robins destroyed in accordance with the demands made by a few fruit growers. Likewise, Pear Blight is disseminated by so many methods besides bees, that no one is justified in making complaint against the been on this account. In fact, it is not definitely proven that the Honey Bee does disseminate the germs of this deadly

bacterial disease, and on the other hand it is known that the disease may kill trees under conditions which prohibit the intervention of the honey bee. For example, this spring I planted an orchard of young pear trees late in the spring, when the weather was so cool that bees were not flying. Also, of course, the trees just set out contained no blossoms, and I saw no signs of exuding juices or sap. Thus it was certain that there was nothing to attract the bees to them, and I am convinced that no bees were near these young trees. However, within a short time after planting the trees, they commenced to show signs of being infected with blight, and the disease spread over the trees and finally killed many of them. It was probably carried to them by an infected pruning knife in trimming the branches, or by the wind, or by some other means, even in the nursery before they were shipped. Thus we see that the condemnation of the bee in such case is entirely unjust. Let us unite to study and disseminate a knowledge of the truth, and if possible add new points occasionally to such an important though time-honored subject as "Bees and Horticulture," and thus we may feel justified in our efforts.

The CHAIRMAN: I am sure we are all very grateful to Prof. Surface for the valuable paper he has given us showing the close identification of our line to fruit growers, and defending our little pets. We all know that bees are found not to be injurious to fruit growers.

Mr. HOLTERMANN: It was my pleasure to hear Prof. Surface at the National, and I was very much pleased that he was going to come here. This is along the line of what we need, and I can quite endorse his statements as to the experiment with the plums. I happen to know that there is a photograph to be taken of that plate with the fruit upon the hive and that it is to be embodied in the National Bee-keepers' report. I was asking him if he would have any objection to having that same photograph sent to our Association, and he said he would be pleased to do so, so I think it would be well to embody it in this report.

Mr. DICKENSON: I have been very much pleasad with the address, and I think it will do a lot of good to people who do not understand what relation there is between bee-keepers and fruit growers. There is one thing I would like to emphasize in connection with putting a trough of water in an orchard. I think it is very important. It saves trouble and annoyance in regard to bees going for water. A little salt in the trough is a good thing to tempt them. If they get started they go pretty regularly and in great numbers.

Mr. LAING: What is the general medium for fertilization of apple blossoms?

Prof. SURFACE: I think in many cases apple blossoms are self fertile; in others they are not. It may be any of the flying insects; it may in some cases possibly be the wind, but we know the majority of the varieties are self fertile. However, I would not recommend planting more than six rows of apples of any one kind; then plant six of another kind. If I wanted to plant twelve acres of apples of four kinds, I would plant them in that way to ensure this cross fertilization and setting of the fruit.

Mr. HOLTERMANN: Do you think the seasons make any difference? It seems to me that there are seasons when the bees would be the means of giving a much heavier yield for certain things, if they were in the vicinity, than there would be if they were not.

Prof. SURFACE: They undoubtedly have their influence, especially upon some kinds of blossoms. I had 76 colonies in my apiary near an apple orchard, and when the trees were in blossom I saw no bees working upon them,

and yet we had in our vicinity a magnificent apple crop. So that we cannot say it was due this year to the bees. Yet, we had a short crop in pears and plums, and I expect the shortage in the plum crop was very largely due to the absence of the bees.

Mr. HURLEY: I have listened with very great pleasure to the paper by Prof. Surface. In fact, like Mr. McEvoy, I would say it is the best paper I have ever heard. I have noticed in the early spring when the maple buds opened up, the bees gathered pollen from them. Is it possible that bees gather pollen from apple or other fruit trees immediately after the buds open before the blossoms appear? If so, will not the early spraying possibly hurt the bees?

Prof. SURFACE: That is not possible until the petals are expanded. The spraying for scale insects is done before the blossoms expand, and for the codling moth after the petals fall. Those spraying liquids would not come in contact with what are called the essential organs of the flowers. However, there is one important thing concerning the gathering of pollen by the bee. In order that nature may prevent the full effects of in-breeding in plant life, flowers are so arranged in many cases that they produce pollen before the time when their own pistil is ready to receive pollen; or, on the other hand, the pollen of that flower may be produced after its own pistil has received pollen, and thus prevent cross-fertilization, its pollen being carried to a receptive pistil in another flower. Bees do visit many flowers for the express purpose of gathering pollen. I know they have gathered pollen from the blades of my sweet corn. I should like to see considerable study made, not only of the honey-producing plants, but of the pollen-producing plants. That is a subject we have hardly given any study to. I said we sprayed for the San José Scale before the bud bursts. I mean before the winter resting buds swell, but I did not mean flower blossoms. For San Jose Scale we spray before the first green leaf peeps through its bud. The next spray would be for the Codling Moth, after the petals fall. Those flowers are not open or exposed at the time of the first spraying, and they have passed their period of blooming at the time of the next spraying.

Mr. DICKENSON: I think we are perfectly safe in spraying the apple blossoms before it bursts. You can let it go pretty close to the time it is ready to burst. I have made a practice of spraying before the apple blossom comes out in my orchard. I put a pound of Paris Green to a barrel of water; that is four times more than the regular allowance, and I have had 150 colonies in my orchard, and had no evil results and never saw anything dangerous at all from that spraying. That is spraying for the codling moth.

Mr. MCEVOY: In this country they do not spray any more while the trees are in bloom. These people who find a lot of dead brood in the hive say it is from the spraying, but it is the bee-keeper that is making the mistake as a rule and not the fruit man.

Mr. HOLMES: I am sure I will be voicing the sentiments of all present when I say it has been a real pleasure to listen to the lecture from the Professor, our American cousin, and we hope that he shall carry away such impressions and such pleasant memories with him to his home yonder that he will find his way back here again at some future time. I think, that we would be very remiss in the discharge of our duties and lacking in ordinary civility if we did not at least say "Thank you." Therefore I move that the best thanks of this Association be tendered to the Professor for the great favor he has shown us.

Mr. DICKENSON: I have much pleasure in seconding that motion.

The CHAIRMAN put the motion, which was carried with applause, and the vote of thanks extended to Prof. Surface.

Prof. SURFACE: I feel deeply grateful to you for this expression which you have extended to me. I wish to say that I can assure you I have met with no more pleasant or cordial reception at any place I have been than here and at St. Catharines when I spoke to the Fruit Growers there last spring. I certainly am much gratified to find the breadth and intelligence of discussion that is discernible in a Canadian audience. With all due credit to you, I did not know that you were so far advanced as you really are. You are ahead of us. I must confess that in our Educational and State Agricultural Associations, I did not hear the advanced discussion and depth of questions that you have asked here. You are to be congratulated for your aggressiveness, and then when a stranger comes amongst you, you can take him in. We do that down in Philadelphia and New York too, but it is in a different way. (Laughter.) I appreciate the fact that your doors stand open, and with your heart's right hand you bid us welcome. I hope you will come down across the border and bring us the good news that you are carrying to one another.

THE FUTURE OF THE CANADIAN BEE JOURNAL.

By W. J. CRAIG, BRANTFORD.

It is scarcely my place perhaps, in the presence of the new editor and publisher, to address you on the subject of the future of the *Canadian Bee Journal*. My remarks will, therefore, be principally by way of introducing him to the members of the Association and claiming for him your co-operation.

Most of you are aware that the *Journal* changed hands twice within the last twelve months, first from the Goold, Shapley and Muir Co., who for sixteen years or more published the magazine in connection with the bee-keepers' supply business, to their successors, The Ham & Nott Co., and again from the latter to the Hurley Printing Co., of Brantford, whose chief, our fellow member, Mr. J. J. Hurley, is present with us to-day, and who will no doubt tell you of some of his plans and purposes regarding the future of the *Canadian Bee Journal*.

Allow me, however, when before you, Mr. President, to cordially thank the members of the Association on behalf of the recent publishers and myself, not only for their financial support, but also for the friendly and kindly attitude of one and all during our connection with the *Journal*, and for the material and valuable assistance rendered by a considerable number. We believe that our readers will bear me out in saying that while endeavoring to advance the cause we represented; that of bee-keeping in Canada; we have done so altogether uninfluenced by business motives, nor have we been made the organ of any fraction of a means of venting spite or petty personal grievances.

As to the future, I shall leave that with the new editor and publisher. I would bespeak for him your larger co-operation. That, perhaps, is the weakest point in connection with the *Journal*. Our Canadian bee-keepers, while not lacking in practical knowledge and ability, are exceedingly timid or indifferent to expressing themselves in their national apicultural magazine. I trust, however, that this weakness may be gradually remedied under the new management. In connection with it a department might be conducted

by the Ontario Bee-Keepers' Association, and probably the secretaries of local associations might be brought into sympathy with the work, so that we might have a considerable amount of local information that would add interest, individuality, to our representative magazine.

Mr. HURLEY: In taking over the *Canadian Bee Journal* I have done so with a considerable amount of fear, and am rather in doubt whether I might be able to conduct it in such a manner as to please the bee-keepers of the Province. However, I can assure you so far as I am able I will do the best I can.

The *Bee Journal,* when I took it over, and in fact for the last couple of years, had been at a very low ebb. This was no fault of Mr. Craig's, but rather the conditions under which it was produced. It was chiefly regarded by those who owned it and controlled it as a medium for advertising, and Mr. Craig's duties were primarily to look after the supply department. I know that Mr. Craig is a very busy man, and you can understand that when a man is busy all day he can hardly devote all his nights to a work of this kind, so the *Bee Journal* has been, so to speak, up against it. It was leaning upon another department. But now it is in my hands, and it has got to pay or die, that is all. I have got to make it pay or drop it. I believe it can survive. I find, however, that the advertising proposition of the *Bee Journal* is a very difficult problem because the field is very restricted for advertising. A poultry journal is in a much better position to secure advertisements than a bee journal, because there is a wide field of accessories to a poultry proposition that there is not to a bee journal. The only ones who advertise in a bee journal are bee supply men. They hitherto have not been advertising in it, but I have hopes that they will. Outside of that there are very few persons who desire through the *Bee Journal* to reach the farming public with farm ads. Some journals, owing to their large advertising field, could well afford to give their journals away. Some of the larger magazines, if the post office authorities would permit it, would readily give their magazines away in order to show their advertisers they had a wide circulation, because their journal could exist upon that. That is a source of income for the *Bee Journal* that is at present restricted. Consequently we have to look to the loyalty of the bee-keepers to sustain the *Journal* by way of subscription. I also find on taking over the list that it is at a very low ebb. I understand there are somewhere about four or five thousand bee-keepers in Ontario, big and small, and there are only about 500 paying subscribers on the list at the present time. When I tell you it takes from $60 to $75 a month to put the journal out you can easily figure how much loss there is on that proposition in a year. Taking 500 paid subscribers, perhaps one-half of them only paying fifty cents a year, that is $125 and the other half paying $1 a year would be $250. The subscription list is not adequate to pay the printing of the journal, to say nothing of the payment of contributors, of postage, or of the time and labor of the men engaged in editing it and turning it out. It has actually not paid its printing bill in the past.

I believe the membership of this Association this year has increased considerably; that I trust will be some help. I propose to put out this year 2,000 *Bee Journals* every month as fast as I can get the names and addresses of the bee-keepers of the Province of Ontario and the West; and the members of this Association, if they would, could help me very materially by giving me the addresses of the bee-keepers who are in their neighborhood; and I believe there will be a larger percentage of those to whom it is sent, when they discover that it would be of great assistance to them, will put their hands in their pockets and send a dollar in and become subscribers.

From what I can see of the bee-keepers gathered here I see a considerable altruistic spirit shown by all of you; and I believe if *The Journal* is sent to

the bee-keepers of Ontario and they discover its possible value they will show some appreciation by recommending it to those who have not hitherto been receiving it. That to my mind is the only plan at the present time by which we can increase the subscription list from what it is, and I hope that we will get a considerable response.

If we could get a thousand paid subscribers, with the few advertisements we run, we might perhaps be able to cover the printing account. If we do not do that the proposition will not be a paying one. I hope the bee-keepers who are here to-day will regard this matter as a personal one. The *Journal* is your journal; and it is published in your interests, and I trust you will take a greater interest in it. Questions are here asked and answered. If you send those questions to the editor of the *Bee Journal* frequently, we will secure someone competent to reply to them, and they will reach a wider field than you can possibly reach any other way. In that way we will get all the bee-keepers interested in each other and in what is going on. Don't be afraid, don't be too humble; don't think that the editor of The Journal is being annoyed; he is only too glad to hear from you. It is that sort of thing that creates interest and a co-operative spirit among the bee-keepers.

I would like to say also I am entering upon this work afresh. I have been almost a stranger to many of you. We are starting with a clean sheet, and none of you are enemies of mine, nor am I the enemy of any of you, and I trust this will continue. I know that no matter how able a newspaper man is, or how cautious, he is bound to give offence to some, and there are a large number of persons who are very sensitive and apt to take offence when none is intended. I trust no one will take offence at anything of an imaginary nature. If there is any offence given to anybody at any time don't be afraid to write to us and tell us. Fire us in some good hot shot. I am Irish, and I like a fight once in a while; and I promise if we get into a little scrap I will never hit under the belt. It is to my interests to be friendly with all and to offend none.

I hope during the next year I will hear from the bee-keepers liberally, and I promise you I will not spare anything in making the *Bee Journal* a credit to the bee-keepers of the Province of Ontario. If you have any printing to be done we can do it, and I believe my printing plant and *The Journal* will dovetail very nicely, and we can produce it in such a way that it may ultimately be profitable to ourselves and to you. (Applause.)

The CHAIRMAN: We all feel we must have the *Canadian Bee Journal*. We need to take all the journals we can. I think we should give all the support we can to the new editor to help him along.

Mr. Hurley's remarks were followed by a short discussion participated in by Messrs. Laing, Dickenson, Holtermann, Grainger, Byer, Brown, Couse, Newton, McEvoy and Couse, who all spoke strongly in favor of supporting the *Journal*

PURE FOOD LAWS.

The following resolution was presented: Moved by Mr. R. H. Holtermann, seconded by Mr. A. A. Ferrier, and resolved, "That the members of the Ontario Bee-Keepers' Association place themselves on record as favorable to and urging that a more stringent and vigorous policy for the enforcement of the Pure Food Laws by the Department of Inland Revenue at Ottawa; also that they are strongly of the opinion that such terms as "Pure

Fruit Jam Compound," "Pure Maple Syrup Mixture," "Pure Honey Mixture," shall not be used in connection with adulterated goods as is now being done, very many of the public not knowing that terms so used veil adulteration. That when adulterated goods of the above description are used in hotels and other public places supplying meals and lunches, it shall be so stated by those selling the goods, thus only putting them on the same basis as grocers, confectioners, etc."

Mr. DEADMAN: I would like the Association to prosecute every man who adulterates honey. I do not think it is the bee-keepers who adulterate it. I think it is the men doing a wholesale business. That was shown by the report of the Inland Revenue Department. If they can find any of my honey adulterated let them prosecute me.

Mr. GRAINGER: There is a law now which covers that resolution. I think what should be done is to find out exactly what the Act means.

Mr. HOLTERMANN: The resolution goes further than the Act at present. We, in our Pure Food Laws, were at one time away ahead of the United States. Now their Act goes father than ours, and with the result that confidence is being established in United States' goods. What we want to do, if possible, is to prohibit the use of the word "Pure" in connection with any adulterated goods.

The Chairman put the motion, which , on a vote having been taken, was declared carried.

The CHAIRMAN: I am very pleased with the large attendance we have had at our meetings and the harmonious feeling that has prevailed. I wish to thank each member for the kind support they have given the Chair.

Mr. HOLTERMANN moved, seconded by Mr. CHRYSLER, that the Convention of 1907 do now adjourn, which, on a vote having been taken, was declared carried.

APPENDIX.

HONEY PRIZE LIST.

Ontario Horticultural Exhibition.

Section 1. Twenty doz. comb in sections: 1st, E. Grainger & Co., Deer Park; 2nd, Mrs. D. Anguish, Lambeth; 3rd, Geo. Laing, Toronto.

Section 2. Five doz. comb in sections: 1st, Mrs. D. Anguish; 2nd, E. Grainger & Co.; 3rd, Geo. Laing.

Section 3. One doz. comb in sections: 1st, J. H. Thompson, Britannia; 2nd, Mrs. D. Anguish; 3rd, E. Grainger & Co.

Section 4. 200 lbs. extracted honey, ½ in glass and ½ in tins: 1st, H. G. Sibbald; 2nd, Mrs. D. Anguish; 3rd, Geo Laing; 4th, E. Grainger & Co.

Section 5. 50 lbs. extracted. in glass: 1st, Mrs. D. Anguish, 2nd, Geo. Laing; 3rd, E. Grainger & Co., 4th, H. G. Sibbald.

Section 6. 10 lbs. extracted Clover honey in glass: 1st, Mrs. D. Anguish; 2nd, Geo. Laing; 3rd, H. G. Sibbald; 4th, E. Grainger & Co.

Section 7. 10 lbs. extracted Linden honey in glass: 1st, H. G. Sibbald; 2nd, Geo. Laing: 3rd, Mrs. D. Anguish; 4th, J. H. Thompson.

Section 8. 50 lbs. extracted granulated honey: 1st, H. G. Sibbald, Claude; 2nd, Mrs. D. Anguish; 3rd, Geo. Laing; 4th, E. Grainger & Co.

Section 9. Display 200 lbs. comb and extracted for grocer's window: 1st, E. Grainger & Co.; 2nd, Geo. Laing; 3rd, Mrs. D. Anguish; 4th, H. G. Sibbald.

Section 10. 25 lbs extracted buckwheat honey in glass: 1st, R. F. Holtermann, Brantford; 2nd, E. Grainger & Co., 3rd, Mrs. D. Anguish; 4th, H. G. Sibbald.

Section 11. Two doz. buckwheat honey in sections: 1st Geo. Laing; 2nd, E. Grainger & Co.

Section 12. Ten lbs. beeswax: 1st, Miss B. Treverrow; 2nd, H. G. Sibbald; 3rd. Geo. Laing.

Section 13. Six articles containing honey: 1st, Mrs. D. Anguish; 2nd, Geo. Laing; 3rd, E. Grainger.

Section 14. New invention for beekeepers' use: 1st, R. F. Holtermann; 2nd, J. Alpaugh; 3rd, H. G. Sibbald; 4th, D. Anguish, Lambeth.

Section 15. Display of bees and queen which may be seen by visitors: 1st, E. Grainger & Co., 2nd, F. W. Krouse, Guelph; 3rd H. G. Sibbald; 4th, Geo. Laing.

Section 16. Method of crating and packing comb honey for shipment: 1st, Geo. Laing; 2nd, D. Anguish; 3rd, E. Grainger & Co.

Section 17. Best packages for long distance shipment of extracted honey, showing method of packing and crating: 1st, R. F. Holtermann; 2nd, Geo. Laing; 3rd, H. G. Sibbald; 4th, D. Anguish.

Section 18. Best package for retailing extracted granulated honey (filled): 1st, Geo. Laing; 2nd, Mrs. D. Anguish and E. Grainger.

AN ACT FOR THE SUPPRESSION OF FOUL BROOD AMONG BEES.

CHAP. 51, 6 EDWARD VII., 1906.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as folows:

1. This Act may be known as "*The Foul Brood Act.*"

2. The Lieutenant-Governor in Council upon the recommendation of the Minister of Agriculture may from time to time appoint one or more Inspectors of Apiaries to enforce this Act, and the Inspector shall, if so required, produce the certificate of his appointment on entering upon any premises in the discharge of his duties. And the Minister shall instruct and control each Inspector in the carrying out of the provisions of this Act. The remuneration to be paid to any Inspector under this Act shall be determined by order of the Lieutenant-Governor in Council.

3. The Inspector shall, whenever so directed by the Minister of Agriculture, visit without unnecessary delay any locality in the Province of Ontario and there examine any apiary or apiaries to which the said Minister may direct him, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and wherever the said Inspector is satisfied of the existence of foul brood in its virulent or malignant type, it shall be the duty of the Inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immediately destroyed by fire under the personal direction and superintendence of the said Inspector; but where the Inspector, who shall be the sole judge thereof, is satisfied that the disease exists, but only in milder types and in its incipient stages, and is being or may be treated successfully, and the Inspector has reason to believe that it may be entirely cured, then the Inspector may, in his discretion, omit to destroy or order the destruction of the colonies and hives in which the disease exists.

4. The Inspector shall have full power, in his discretion, to order any owner or possessor of bees dwelling in box-hives, in apiaries where the disease exists (being mere boxes without frames), to transfer such bees to movable frame hives within a specified time, and in default of such transfer, the Inspector may destroy, or order the destruction of, such box-hives and the bees dwelling therein.

5. Any owner or possessor of diseased colonies of bees, or of any infected appliances for bee-keeping, who knowingly sells or barters or gives away such diseased colonies or infected appliances, shall on conviction thereof, before any Justice of the Peace, be liable to a fine of not less than $50 or more than $100, or to imprisonment for any term not exceeding two months.

6. Any person whose bees have been destroyed or treated for foul brood who sells or offers for sale any bees, hives or appurtenances of any kind, after such destruction or treatment, and before being authorized by the Inspector so to do, or who exposes in his bee-yard, or elsewhere, any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among his bees, shall, on conviction before a Justice of the Peace, be liable to a fine of not less than $20 and not more than $50, or to imprisonment for a term not exceeding two months, and not less than one month.

7. Any owner or possessor of bees who refuses to allow the Inspector to freely examine said bees, or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or to permit them to be destroyed when so directed by the Inspector, may, on the complaint of the Inspector, be summoned before a Justice of the Peace, and, on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and not more than $100 for the second and every subsequent offence, and the said Justice of the Peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the Inspector.

8. Where an owner or possessor of bees disobeys the directions of the said Inspector, or offers resistance to, or obstructs the said Inspector, a Justice of the Peace may, upon the complaint of the said Inspector, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the direction of the Inspector, proceed to the premises of such owner or possessor and assist the Inspector to seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said Inspector or constables may arrest the said owner or possessor and bring him before a Justice of the Peace to be dealt with according to the provisions of the preceding section of this Act.

9. Before proceeding against any person before a Justice of the Peace, the said Inspector shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such person.

10. Every bee-keeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the Minister of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of $5 and costs.

11. Each Inspector shall report to the Minister as to the inspection of any apiary in such form and manner as the Minister may direct, and all reports shall be filed in the Department of Agriculture, and shall be made public as the Minister may direct or upon order of the Legislative Assembly.

12. Chapter 283 of the Revised Statutes of Ontario, 1897, entitled *An Act for the Suppression of Foul Brood among Bees*, is repealed.

ANNUAL REPORTS

OF THE

Dairymen's Associations

OF THE

PROVINCE OF ONTARIO

1907

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1908

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TORONTO.

To the Honourable Sir William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario:

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Dairymen's Association of Eastern Ontario for 1907; and the Report of the Dairymen's Association of Western Ontario for 1907.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1908.

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FINANCIAL STATEMENTS FOR 1907.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Receipts:	
Cash on hand from 1906	$1,142 57
Members' fees	245 00
Grant from Ontario Legislature	2,000 00
Grant from City of Ottawa	100 00
Advertisements in programme	175 00
Total	$3,962 57
Expenditures:	
Accounts paid for previous years	$74 00
Executive meeting expenses, January	60 00
Directors' expenses, annual convention, Ottawa, January	471 50
Directors' expenses, Toronto, September	186 00
Miscellaneous expenses at annual convention	85 15
Expenses of local dairy meetings: Alexandria, Almonte, Avonmore, Central Smith, Cold Springs, Elgin, Kemptville, Kingston, Lindsay, Madoc, Napanee, Ottawa, Peterboro, Picton, Smithfield, Warkworth	812 45
Advertising annual meetings and local dairy meetings	234 50
Printing programmes, stationery, etc.	148 25
Postage	45 00
Express charges	14 60
Reporting Convention	110 00
Salaries: Secretary, $300; Treasurer, $100; Auditors, $50	450 00
Butter scoring contest	35 00
Special prizes, Central Canada Exhibition	50 00
Dairyman Pub. Co., calls on stock	150 00
Subscriptions to Canadian Dairyman	171 50
Miscellaneous	15 25
Cash on hand	849 37
Total	$3,962 57

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

Receipts:	
Cash on hand from 1906	$1,120 43
Members' fees, $346; donations, $39.75	385 75
Grant from Ontario Legislature	2,000 00
Money received from prosecutions	1,085 00
Advertisements in programme	155 00
Sale of exhibits	1,553 51
Total	$6,299 69
Expenditures:	
Cash paid for exhibits of cheese and butter	$1,475 68
Cash paid for prizes at annual convention	348 75
Inspector: services, $270; expenses, $214.40	484 40
Dairyman Pub. Co., call on stock	150 00
Canadian Dairyman, members' subscriptions	240 03
Reporting annual convention	75 00
Office: stenographer's salary	333 00
Office furniture	32 20
Office rent	117 60
Office expenses	37 55
Telephone and telegrams	83 03
Expenses of annual meeting	259 38
Postage, stationery, printing and advertising	282 17
Expenses of directors	278 28
Expenses of Judges	45 00
Expenses of lecturers	77 10
Auditors' fees and expenses	13 00
Express and cold storage charges	7 30
One-half fines paid to factories	542 50
Cash on hand	1,417 72
Total	$6,299 69

OFFICERS FOR 1908.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Honorary President, - - - - Hon. D. Derbyshire, Brockville.
President, - - - - - - J. R. Dargavel, Elgin.
1st Vice-President, - - - - Henry Glendinning, Manilla.
2nd Vice-President, - - - - John Singleton, Smith's Falls.
Secretary, - - - - - - R. G. Murphy, Brockville.
Treasurer, - - - - - - Jas. R. Anderson, Mountain View.

Directors:

Neil Fraser, Vanleek Hill.
Edward Kidd, North Gower,
John Carscaden, Russell.
John McGregor, Alexandria.
Angus Grant, Moose Creek.
C. F. Whittaker, Williamsburg.
James Whitton, Wellman's Corners.
T. A. Thompson, Almonte.
Joseph McGrath, Mount Chesney.
W. J. Paul, Tamworth.
T. B. Carlaw, Warkworth.
G. A. Gillespie, Peterborough.
G. G. Publow, Kingston.
Jas. A. Sanderson, Oxford Station.

Auditors:

F. W. Brenton, Belleville. J. A. Kerr, Belleville.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

President, - - - - - - Jno. Brodie, Mapleton.
1st Vice-President, - - - - J. J. Parsons, Jarvis.
2nd Vice-President, - - - - Jno. H. Scott, Exeter.
3rd Vice-President, - - - - Wm. Waddell, Kerwood.
Secretary-Treasurer - - - - Frank Herns, London.

Directors:

Geo. A. Boyes, Putnam.
J. N. Paget, Canboro.
S. R. Wallace, Burgessville.
D. A. Dempsey, Stratford.
J. B. Smith, Alton.
W. S. Stocks, Britton.

Auditors:

J. A. Nelles, London. J. C. Hegler, Ingersoll.

Representative to Canadian National, Toronto, Robt. Johnston, Woodstock.
Representative to Western Fair, London, - Geo. M. Mackenzie, Ingersoll.

Dairymen's Association of Eastern Ontario.

ANNUAL MEETING.

The thirty-first annual convention of the Eastern Ontario Dairymen's Association was held at the town of Picton on Wednesday, Thursday, and Friday, January 8th, 9th and 10th, 1908.

It can be truly said that this was one of the best dairy conventions ever held in the Dominion of Canada. The attendance was so great at nearly every meeting that numbers of people had to be turned away. The people of Picton did everything in their power to entertain the visiting dairymen. The regular sessions were held in the Parish Hall, and the evening sessions were held in the First Methodist Church.

PRESIDENT'S ADDRESS.

By John R. Dargavel, M.L.A., Elgin.

It is with pleasure that I vacate the chair for our esteemed Honorary President, Senator Derbyshire, who has so recently been made a Senator; and whilst I wish to congratulate him on having been thus honored, I also wish to congratulate the Premier of the Dominion and his cabinet upon having displayed good judgment in coming to the Eastern Ontario Dairymen's Association to make the selection; and I would further remind them that among the various other callings of life can no greater number of men of ability be found to fill such responsible positions than among the dairymen of Canada.

I also wish to express my pleasure at the holding of the convention, at this time, in the historic town of Picton, in Prince Edward County, where, I am informed, the dairymen have responded to the instruction given, and have made as great, if not greater improvement, than any other county in Eastern Ontario.

I desire also on behalf of the directors of our Association, to thank you for the cordial reception extended to us, and for the assistance given by the local committee to our secretary, Mr. Murphy, in making the preliminary arrangements for this meeting, and to your town council, your county council, your bankers and business men for their financial aid in bearing some of the expenses incident to the holding of a meeting of this kind.

We are here in convention to-day to look over the work of the year just passed, and to plan our work for the future. No dairyman, who keeps cows for profit, can close up his business for the year any better than by attending meetings of this kind and learning (through the experience of others) of the mistakes he has made. Neither do we know of any more profitable way for him to commence the new year than by attending this convention, and through an interchange of ideas and experiences lay the foundation and assist others in laying the foundation for a successful business in 1908.

An Association of this kind means organization and an organized effort, the influence of which has been good. It has been the means of building up dairy sentiment, and of diffusing dairy information and knowledge, and it has worked for the advancement of the dairyman's interest.

It has proved itself worthy of your support and the co-operation of all those who have a direct or kindred interest. I hope and in fact I am looking for a good attendance at each session during the three days we are with you.

Our meeting here is for educative purposes, and I hope it may fulfil the mission for which it is held and be profitable, not only to the dairmen of Prince Edward County, but also to the whole of Eastern Ontario.

We regret to say that the dairy season of 1907, as far as the export movement is concerned, has been disappointing, the exports of both butter and cheese showing a marked falling off from those of last year, as well as being considerably short of the average of the past few seasons. The aggregate value of Canadian cheese and butter exports for 1907 will be, in round numbers, about $23,000,000, against $29,000,000 for 1906.

The small make of cheese this past year, compared with previous years was, no doubt, due to the very late spring and the poor pasturage during the season. Throughout all of Eastern Ontario the season was very backward, owing to the continued cold weather, which retarded the growth of grass. Towards the close of the season, the make was also reduced by the cold, wet weather coupled with the shortage and high prices of food which is used at this time to keep up the flow of milk. Feed was so scarce that many farmers sold some of their stock at a great sacrifice. In our opinion, this state of things could have been remedied, and I am looking for some of our speakers to deal with this matter in some of their addresses.

We are pleased to be able to say that through the Dairy and Cold Storage Commissioner's branch of the Department of Agriculture, at Ottawa, we have been able to get better carrying facilities and our cheese have, in consequence, reached their destination in better condition. This, together with the improvement of quality and the shortage of make, has kept the average price of our goods for the season of 1907 in excess of the previous year.

The improvement of quality has been brought about by the untiring energies of our chief instructor and sanitary inspector, G. G. Publow, who with 24 competent men under him have kept a close surveillance over the sanitary production of the raw material and its skilful manufacture into cheese.

Among the new lines of dairy work recently inaugurated, was the holding of special dairy meetings in each of the districts represented by the various directors on our board. About twenty of these were held in the months of November and December, and were addressed by the local director, your President, Honorary President, Secretary, Henry Glendinning, Geo. W. Barr, official referee, and N. G. Somerville. For the services of the last two named gentlemen we are indebted to our friend, J. A. Ruddick, Dairy Commissioner, at Ottawa, and on behalf of our Association, I tender thanks to Mr. Ruddick for sending to our aid these two men, who were so acceptable to the people. The meetings were generaly well attended, and the results have been such as to warrant a continuance of this means of carrying information to the patrons in districts that do not come so directly under the influence of these large conventions.

Another matter which has contributed in a large measure to the improvement in quality of our goods has been the fact that the Government took upon itself the entire cost of instruction and inspection, and in so doing saved for the dairymen of Eastern Ontario about $15,000, and made it possible for our inspectors to reach a large number of poor factories which heretofore had escaped inspection and instruction.

All of these things have combined to make our work of use to the dairymen of the eastern part of this Province, but I am sure that I voice the opinion of each of the directors of this Association when I say that were it not for the liberality of the Department of Agriculture for Ontario, of which the Hon. Nelson Monteith is its Minister, this educational work could not be carried on. We appreciate the aid he has given us, and whilst he has looked well after the varied interests of the agriculturists, as a whole, we are pleased to know that the dairy industry of Canada, which takes rank among those of most importance, has not suffered at his hands.

This Association has for its object the furthering of the interests of the dairy industry in all its branches in the eastern part of the Province. It is true, we have not yet reached the goal of perfection, but each year shows improvement along some line, and these gatherings (such as I expect this to be) contribute in no small degree to the success of the good work. It is here we can compare notes, and get fresh enthusiasm from coming in contact with men who have overcome difficulties similar to those which confront us. It is here we can listen to men of distinction who are willing to contribute of their acquired knowledge to us.

I am not going to prolong this address, as I may have something to say from time to time as your President; but in conclusion I am going to predict that with the short make of this past season, with the markets bare and with the improved quality we can fairly hope for increased prices this coming season.

I also wish to say that the board of directors and officers of this Association with whom I have been associated during the year just passed have given you their best service, and all that has been done has been done with a view to the upbuilding of this great national industry.

DAIRYING AND NATIONAL PROSPERITY.

By Hon. D. Derbyshire, Brockville.

I want in the first place to congratulate you, Mr. President, on the marked ability which you have displayed in the year 1907. You have given careful attention to all matters pertaining to the work of bettering the conditions of the dairymen in Eastern Ontario, and as one of the representatives of the Local Government, you have been on the floor of the House and have been of great service to dairying in such a conspicuous place as you have occupied in the Legislature. I was particularly delighted with the work you did there in connection with the Eastern Dairymen's Association. The $15,000 that you got from the Government to relieve the factories of the $15 that each paid for the use of an instructor was a great advance, and something which the eastern dairymen have been trying to get for years. We could never bring the Minister of Agriculture to the point of granting it. There never was a Minister of Agriculture that for half a minute could argue against the granting of this money. Why should not the dairymen have free education the same as the schools? Why should not this great national industry have free education?

We feel particularly pleased with our reception in Picton. We have received a warm welcome from the mayor of the town and from all the people, and they have done everything they could to make these meetings a success.

We have been particularly pleased with the new step we took of holding meetings throughout the different districts in Eastern Ontario. It was really a great step in advance. We are under a great debt of gratitude to Mr. Ruddick, Dairy Commissioner, for the assistance he has given us, and I would like to mention Mr. Barr, the official referee at Montreal, and Mr. Somerville, and also Mr. Whitely for the work he has done in connection with the Cow Testing Associations. This has been a great benefit to the farmers of this Dominion.

The $6,000,000 that we have lost this year means hard times, means stringency: it means that every industry in our land is crippled because the dairymen did not do the business that they should have done. You can see the importance of the dairyman to this Dominion. You see what it means to the people of this country for the dairymen to stand to the front and do their work properly. It means that every spindle in every factory, every merchant, every manufacturer, and every business man in the Dominion will be benfited if the dairymen are prosperous. What was the trouble when, last year, we made $6,000,000 more money than we ever made in the history of the country. Didn't it mean that every industry in 1906 was prosperous; didn't it mean that the merchants were doing more business than ever before; didn't it mean that the manufacturers had more orders than they could fill, and every industry in the land was flourishing on account of the progressive dairymen who had put their cheese and butter and bacon pig on the market and had brought $6,000,000 into the country?

This is the commencement of 1908, and we ought to lay our plans for growing feed of a better quality, and to see that we do everything in a proper way so that our cows can be fed. We ought to put up a silo if we have not got one, and we ought to set aside feed for 1909. Do not make any mistake about that. The man who had a silo last year for the dry weather had feed in May, when there was no grass for the cattle, and he could keep them right up in the condition they should be in. If we are going to lead as we have been leading we must provide for dry weather and we must keep everything in the very best condition. If we can educate the men and get them filled with enthusiasm here and make them understand that, then when they go home they will be prepared for new active work in the direction of better dairy work. If we can have them feel that there is something in the business, so that they will take hold and get a better cow and provide fodder so that she can be fed all the year round, no matter what happens to the pasture or weather conditions or anything of that kind; if we can have our stables so built that they will be comfortable any day of the year, then we will produce more butter and cheese in this country and everybody will be prosperous. What we want is more and better feed. You should not try to see how little you can feed the cow, but you should encourage her to eat more and more.

Never in the history of Canada was milk so scarce. There was never a time in the history of Canada when milk was worth as much as it is to-day. There never was a time when there was a greater demand for milk and butter and cheese than there is to-day. And why don't we produce it? Why don't we take hold of this business in a business way, and see that we have these things provided so that we can place ourselves in the condition of being intelligent people and build up this Dominion on account of our intelligence and thoughtful work in connection with this great national industry?

Sometimes it is very discouraging when we go to certain sections as we did this year and see the factories in such poor condition. We see some old factory with the same old leaky roof, and the same old boards on the side where the wind can whistle through, and you can see the leaky floor where you can look right down into the dirt and mud the same as you could years ago. Is not that discouraging? We want better factories in some sections, and one of the great benefits of these meetings that we held in the different sections was that we took up these matters where they were most needed and discussed them. We had a slick lot of speakers, right up-to-date, and they understood what to do, and they did it in a nice, intelligent way.

I agree with what you say in regard to the Province of Ontario and the Minister of Agriculture, and I am delighted that he has taken hold of our dairy work and assisted us and co-operated with the Eastern Dairymen in the way he has since he has been Minister of Agriculture in this Province. He has given us a larger grant and given us the power of bringing this education so easily to the people. I am delighted that this has been done, and I am pleased that he is going to be here to-night to speak for himself and give us the assistance and co-operation and words of direction and wisdom for 1908.

If we had a man in every home who was filled with dairy enthusiasm, about the selection of the best cow and testing it and the production of a larger and better quality of milk, we would make greater strides than ever before. What do they do in some of the localities? They sit around the house, and when you go and talk to them about milk for next year they are not decided whether they are going to send any or not. They are going to find out if they cannot get it drawn for nothing, down to the other factory. They are going to find if they cannot get a little off the price of manufacturing. They are trying to pare down here and pare down there, and make it so that the cheese-maker cannot make a silver dollar all summer. That is not the way to make him do the best work for you. That is not the way you are going to get enthusiasm in connection with the production of a finer quality of cheese. Walk right to the front, and go down and take the cheese-maker by the hand and let him know you are going to send more milk of a better quality, and that you are going to give them assistance and co-operation throughout the year. Stay by him, and make that factory the factory of the locality on account of your warm sympathy and your hearty co-operation. If you will do that, every factory will come right to the front, and you will have a man in charge who will be an educative power in the community.

The Dominion Government have done everything in their power to carry these goods from the station to the Montreal point of shipment, under the best conditions, and they have provided refrigerator compartments in the ships so that our goods can be delivered to the English market in a fancy condition. All that has been done to give assistance and co-operation, and all we lack is the man on the farm and the man in the factory to co-operate with us in connection with this.

The Ontario Government has given us money and provided us with a means of educating the people, and they have done it cheerfully. They have done all they could to assist us, and it is for us to turn right in with them and with enthusiastic vigor take hold of this work and make 1908 the great year in connection with dairying. Do not be satisfied in an increase of $6,000,000, but make it $10,000,000, more than we ever had before, and

that will mean prosperity in every part of this Dominion. That will mean that everybody will have more money; there will be more money in the land, and there will be no stringency, provided you make it ten million dollars.

You should be ready to take care of your cattle, so that if it does not rain the day you expect it to you will have the feed on hand. Make a study of the feed question during 1908.

You refer to the hearty co-operation you receive from the Secretary and Treasurer in connection with this work. I may say that for several years I knew we had the best men we could get; they were the right men in the right place all the way through, and they have always been in hearty co-operation in connection with carrying on the work, and they have done everything they could to carry on the work. We feel proud of the Board of Directors we selected this last fall; they are enthusiastic in their several localities. With regard to our Secretary, I must say he is untiring in his efforts. Our Treasurer also has been untiring in his efforts to get everything put in the best shape for this convention.

I predict that we are not only going to have better prices in the immediate future, but we are going to have a better class of cheese. We are going to have a better quality of milk and a larger quantity, and we are going to have more enthusiasm in connection with the dairy work in 1908 than we ever had before. We are going to Brockville next year. Cornwall and other places also want us, and I do not blame them.

Now I want you all to go home and make up your minds to do better in 1908 than you ever did before. See that the cows get plenty of ensilage made from corn that has been well hoed and with plenty of ear on it. Have plenty of health and vigor in your stock. Get a good field of alfalfa, have some sugar beet roots to keep the common health, the same as you have for yourself. Cows are very much like the ladies, if you take care of them and make a little fuss over them, they will be swift to attend to you. You can have a woman walk right up with a smile on her face if you just let her know that she is a little better than another woman, and that she can do a little better work than anybody else; and you can make a cow believe that also by kind, careful attention. (Applause and laughter.) See that she gets good light, plenty of food and the best of water. Remember that 89 per cent. of the milk is water. See how much food you can get her to eat in 1908, and how much milk we can produce, and make the dairymen of Canada a power in the land on account of the progressive work we are going to be able to do during this year. (Applause.)

COMMITTEES.

The following committees were then appointed:

Nominating Committee: Hon. D. Derbyshire, Henry Glendenning, James Whitton.

Business Committee: T. B. Carlaw, James Anderson, John Henry Singleton, T. D. Thompson, Edward Kidd.

Legislation: J. R. Dargavel, M.P.P., Hon. D. Derbyshire, R. G. Murphy, G. G. Publow, John McGregor.

Committee on Resolutions: R. G. Murphy, T. A. Thompson, J. H. Singleton.

SECRETARY'S REPORT FOR 1907.

I have pleasure, as your Secretary for 1907, in presenting my report.

The eastern part of the Province of Ontario being more naturally adapted to dairying than grain growing and other branches of agriculture, the farmers are therefore almost exclusively engaged in that branch of business, coupled with hog-raising, which is an adjunct of dairying.

About forty years ago (in 1867) the first Dairymen's Association was organized at Ingersoll, and was known as the Canadian Dairymen's Association. This Association held all its meetings in the west (mostly in Ingersoll) and after ten years of successful work it was found necessary to divide the Province into two parts, and have two Associations, the one to be called the eastern and the other the western; Yonge Street, Toronto, being the dividing line between the two. The first annual convention for the eastern part of the Province was held at Belleville, on the 21st and 22nd, February, 1878. To-day we are holding our 31st annual convention, and a comparison of the exports of that date with the year just passed shows the exports of cheese to have increased as 1.5, or the year 1907 to have exported five times as many cheese as thirty years ago.

The early work of our Association was devoted almost exclusively to educating the cheesemaker and not the patron, but since the establishment of a Dairy School in our midst, the Association has been bestowing considable attention to the education of the milk producer. The patron is being instructed regarding the proper selection of a dairy herd, the proper feeding of his cows, their proper care and the proper care of his milk.

The Association was unusually active during the year 1907 in looking after the dairy industry. The sanitary conditions of the various cheese and butter factories as well as the surroundings at the farm, were dealt with, and for the first time instructors were made sanitary inspectors, which gave them power to enforce cleanliness both at the farm, where the milk is produced, as well as at the place of manufacture. The results of the work done by these men can be plainly seen all over the eastern section.

The new constitution and by-laws, which were submitted at the last annual convention, and which met with your approval, were later submitted to the Honorable the Minister of Agriculture and were sanctioned by him, so we are now working under the new constitution.

One of the most important changes made in our Association work was a greater representation upon our Board of Directors. This necessitated the division of the eastern part of the Province into eighteen districts, in each of which a special dairy meeting is held at some point, which is determined by a committee appointed for that purpose. The committee appointed for this purpose last year consisted of Mr. Putnam, Dairy Director; G. G. Publow, Chief Instructor; President Dargavel, and your Secretary. At these district meetings a representative is selected by the dairymen in attendance. These selections are approved by the Association, and thus the Board of Directors are elected for each year. This increased representation has been in force only this last year, and has worked very satisfactorily.

The membership for the year 1907 was 245. This number is much less than it should be. With the territory it covers and with the number of persons under its jurisdiction there should be a membership of at least as many thousands as we now have hundreds. It is very difficult to get dairymen to realize this, and unless a personal canvass is made I do not see how the number is going to be materially altered. Each one who becomes a member will

receive the *Canadian Dairyman*, the only paper in Canada devoted exclusively to dairying, during the year 1908. The Provincial Government has done well in assisting the Association, and the patrons of every factory in eastern Ontario should become members, which would immensely increase the power of the Association.

There never was a time in the history of the trade, when it was more necessary to be alive to our own best interests, and not only guard the position we now hold, but to get a step higher each year. If by our carelessness or apathy we should lose the position we now hold, or allow others to occupy a more exalted one, the dairymen of this Province would sustain a severe loss.

Some new work along dairy lines has been introduced in a few of our factories this past season. I refer to the manufacture of butter from the whey. This has been in operation in a few of our factories, in the Brockville district, during this past year but as it has not yet become general this Association is not yet prepared to recommend it.

We have, however, looked into the matter far enough to confidently say that small cheese factories cannot add a plant and manufacture butter from the whey at a profit.

We wish to call your attention to the fact that the office work of your Association has greatly increased especially the correspondence. We have also endeavored to keep the interests of the Association and the important features of dairying before the public, by means of the press. We have prepared a number of special articles in the interests of dairying for papers having a circulation in dairying districts with a view to creating more enthusiasm among our dairymen in the work in which they are engaged. We trust that our efforts in this and other directions will meet with your approval.

Before closing this report I wish to convey the sincere thanks of the directors and members of this Association to the Hon. Nelson Monteith, Minister of Agriculture, for his recognition of the Association work by making a liberal grant to meet the expenditures, which the work entails.

Thanking the directors and the members of the Executive Committee for their kindness, during the year.

I remain,

Your obedient servant,

R. G. MURPHY,

Secretary.

ADDRESSES OF WELCOME.

MAYOR FARRINGTON: On behalf of the corporation of the Town of Picton, I am pleased to welcome you. I feel, this is one of the proudest moments I have had since I have had the honor to be the Mayor of the town of Picton. I have presided at many functions during the last three years, but I can assure you, the members of this Association, that it is the greatest pleasure I have had during my term in office as Mayor. I also feel proud that I have the honor of presiding, because in my earliest days I was associated with this great industry. I believe this country has made greater strides than any other county of Ontario in the production of cheese. The citizens of Picton feel especially interested in the county surrounding our town, and we are glad to see the farmers prosper. I am glad that I was instrumental in having you hold your convention in our town, although I

believe it was mainly through the efforts of Mr. Anderson that we at last procured your attendance. After telling of the local enterprises and advantages of Picton, and giving the delegates "the freedom of the town," the Mayor resumed his seat amidst applause.

M. T. G. WRIGHT, on behalf of the Picton Cheese Board, read the following address of welcome:

On behalf of the Picton Cheese Board and Dairymen of Prince Edward County, I extend to you a right royal welcome.

We as dairymen are proud of the high standard that Canadian cheese has taken in the British markets, and the important position it holds in the commerce of this great nation, and are well aware that it is through the excellence of our output that we have attained our exalted position. While, in order to reach this, the individual cheesemaker and dairyman have been the most important factors, yet we realize that it is through the channels of the Eastern Ontario Dairymen's Association that we have derived our education.

We consider it an honor and a great privilege to have you hold this your 31st Annual Convention in our town. Could it have been held during the summer season, we would have been pleased to have shown you some of the fine natural scenery of our county, which we consider is not surpassed by even the far-famed beauties of the old St. Lawrence.

We expect to reap a great harvest of information from your presence among us, and hope that by our hospitality we may make your visit a pleasant one.

PRESIDENT DARGAVEL made the following reply: I am sure we would be less than human if we did not feel gratified at the cordial welcome and very kind words which have fallen from the lips of your Mayor and from the President of your Cheese Board. I am sure that every director and member of our Association has been more than pleased with the reception we have met with in the historic county of Prince Edward. We who have not had the pleasure of visiting this place before have been very much impressed with the appearance of your country and also with the beauties of your little town. I am sure that the citizens of this town may feel very proud of their institutions, their places of business, and their manufactures. I had the pleasure of visiting one of the leading stores of this town, and knowing something about business myself I was struck with wonder that in a town of this size, that you would have a place of business of the magnitude which I saw here. It would be a credit to a city of fifty thousand inhabitants. (Applause) And that shows me as a business man that you must have something back of this and that you must have a prosperous county; because when all is said and done it is the farmers who keep up the town. The wealth comes from the soil, and if you have intelligent farmers, you are bound to have wealth. I am afraid we have been folding our arms in Leeds and resting on our laurels, because I know as a matter of fact the dairymen of this county have been making greater progress than we have. (Applause.) We were one of the first counties to take up the manufacture of cheese in factories; in fact we contend that the first cheese factory ever established in Ontario was built in the County of Leeds. We do not feel at all jealous of you people, but we would like to emulate the progress you have made.

I am sure that after our visit here, and after hearing the addresses which will be given by some of the noted dairymen and some of the best speakers that are to be found in the Province of Ontario or in the Dominion of Canada, you will be greatly benefited. We feel honored that we have with

us not only the Minister of Agriculture for the Province of Ontario, but also the Minister of Agriculture for this great Dominion. These are two men to whom the dairymen of this country owe a debt of gratitude. They have both been in the past, and I am sure they will be in the future, friends of the dairymen of this section. When the question was first mooted of holding this convention in this town we listened to it with some misgivings, from the fact that we did not know just how easily we could reach Picton. I attempted to get here one time last spring but did not get further than Trenton that evening, and not being able to charter a special train I had to go home: but on this occasion after the cordial welcome we have been receiving the question is whether we will be able to get away from here or not. (Applause).

On behalf of the Dairymen's Association, I thank you for the very cordial welcome you have given us, and we will do the best we can to lighten the services of these two constables you have in the place. (Laughter) I thank you very much for the kind words of wecome we have received.

FARMERS' CLUBS.

By G. A. Putnam, Director of Dairying, Toronto.

I can truly say that I am delighted with the proceedings so far. It is with pleasure that I meet with the members of the Dairymen's Association, in Picton. I had the pleasure of visiting this county once before, when I was entertained by our good friend Uncle John Hyatt, and since coming here to-day I have learned so much as to the superiority of your dairying methods that I believe it would be a very good thing for the Superintendent of Farmers' Institutes and the Director of Dairying Institutes to come here and spend a month or so.

One is moved to admiration for your Association when we listen to the splendid addresses given by the able men you have in office, and when we note the readiness with which the cheesemakers enter into the discussion, and I have no doubt this afternoon will be productive of great good. There is a unity of spirit among the dairymen of the Province for the one object that we have not had before. I think the instruction work this season has done more to bring the manufacturers and owners of the factories and the producers of milk together than anything else. We have two splendid men in charge of dairy work in this Province, Mr. Herns in the west and Mr. Publow in the east. You would have some difficulty in equalling these two men were you to search the continent over. Your Association must be congratulated upon the advice given the Department last year that some re-organization must take place in dairy instruction work, whereby we would be able to reach all the dairymen. In the past we asked the factory to make application for instruction. This year, by an additional appropriation, from the Department, and at a loss of revenue of $12,000, we decided to have the whole district put into groups and put men over each group, thus bringing every factory under the influence of the instructors; and the result has been that between 175 and 180 factories which had never before been visited by instructors have received the benefits of this instruction this year. I think our cheese instructor, Mr. Publow, will tell you that in Eastern Ontario these factories are coming now to appreciate that the

efforts of the Department and the Association are first and always to benefit the producer, the maker, the owner of the factory, and all connected with the industry. The reports received by the Department have not been voluminous, but we are more than satisfied with the manner in which this instruction has been received, since every person practically is impressed with the idea that this work is for their benefit, and they are now in a position to support the Department in being a little more vigorous in its efforts to enforce a law which we already have regarding sanitary work in connection with the production and manufacture of cheese.

I do not think we can do better than work along the same lines and be a little more aggressive. Dairy instruction was pushed this year with more energy. The sending of the inspectors to the annual meetings of the factories had good effect. Attending conventions such as you have here, or any other large gathering, has not as good an influence as the sending of a man back among the farmers. At these meetings held at the cheese factories they meet with people who have never had an opportunity of listening to addresses such as you have heard. It is one of the problems of the Department to know how to get these men out to attend meetings, and we thought if we sent speakers to the annual meetings of the factories we would get hold of a large number of men who have never yet taken advantage of the opportunities afforded. If something is going to take place which affects the pockets of a man the next year, then we will get that man at the meeting, and we stipulate that the speakers sent out should be given an opportunity before the business is finished for from a half to three-quarters of an hour. Thus we force these men to listen to the instructions; but we must say they have shown their appreciation of the work, and it is one of the best works we have yet undertaken. Already over two hundred annual meetings have been attended in eastern Ontario, and during January and February we expect that between five and six hundred meetings will be attended. We believe that the owner of the factory and the cheesemaker should co-operate with the patrons.

The work of the Farmers' Institutes covers a very wide field, and in sending speakers out to Eastern Ontario we always see that one member of the deputation is a dairyman. I well remember the first convention I attended in eastern Ontario. I was taken to task by Senator Derbyshire for having sent a poultryman to attend some Institute meetings in Eastern Ontario. "Young man," he said, "if you ever send a poultry man down to Eastern Onario again you will hear from us. We want dairyman first, last, and all the time." That is to a certain extent true; but is it not true that we ask ourselves whether or not we want something else? We still have undesirable milk at some factories in spite of the 65,000 circulars sent out from the Department, and in spite of the instruction which has been given. These are conditions which you must look at and remedy. One means of remedying this will be for the farmers to form clubs. You can call them factory clubs or farmers' clubs or Institute clubs. You want some sort of local organization which will take upon itself to call the farmers of the locality together and discuss their own business in their own way. I speak very earnestly regarding this matter, because in looking over the history of agriculture in Ontario we find that the great majority of these men who have been prominent in these matters during the past decade have been men who in their youth had the advantage of local organizations. The Hon. John Dryden and the Hon. Nelson Monteith both had these advantages, and such men as Thomas McMillan. Mr. Rennie and others tell me they attribute their success largely to the fact of their being a member of some local organizations.

The Department has issued a little leaflet upon the foundation of these clubs. I shall not detain you to give you particulars, but will only say that all that is essential is that some leading person in a community should invite his neighbors to go to the schoolhouse or township hall and form a little organization for the studying of their own problems. Unless you have these clubs you cannot get hold of the men who need improvement in the locality. One other reason why I am very sanguine of the success of Farmers' Institutes clubs is the success which has attended the Women's Institute work in Ontario. In four or five years they have grown from a membership of 2,000 to 11,000. Meetings are now held at four hundred different points throughout Ontario. I believe the farmers of Ontario would derive great benefit from the formation of these clubs (Applause.)

COW TESTING FOR INCREASED MILK PRODUCTION.

By C. F. Whitley, Dairy Commissioner's Staff, Ottawa.

There can be no doubt in your mind that this is a most important subject to bring before a convention. You will have noticed that every speaker who has so far addressed you from this platform has mentioned Cow Testing Associations. That alone is proof positive that it is an important subject, and, still more, one that is coming readily and forcibly to the front. I am very glad indeed to be at this convention. It is not my first trip to this county for I have pleasant recollections of two trips here.

With regard to our Association we are very glad to report it. Roughly speaking, we have three times the number of Associations that we had in 1906. We had 52 Associations representing about 870 herds, and taking over 9,000 cows that were being recorded right through the season and there was very much more interest manifested in the work this year than previously. More interest has been evidenced by the fact that they have been more willing to come to the factory, or wherever the testing is being done, and talk over matters connected with dairying. That brings to my mind the fact that perhaps it is better to have the milk hauled by one member of the family because enthusiasm is then stored up by him.

The great oustanding advantages of cow testing work may perhaps be divided into three parts: a comparison between herds in the same district; between yields in other districts by herds, and then between individual cows in the same herd. I find so many men who totally misunderstand what we are driving at. The mere fact that a cow's milk is weighed does not make that cow give more milk. The object of the cow testing work is to ascertain the exact yield in order to develop a strain of cows that will give a large quantity of milk. Take our records for October last year. We found in Victoria county that 54 cows gave a total record of 19,000 lbs. of milk. In another district twice the number of cows should have given 38,000 lbs; but instead of giving that quantity, we find that 106 cows gave just 65,000 lbs. of milk. That means that 100 cows in one locality are doing the work that 175 cows are doing in another locality. In one section they are still looking for the dual purpose cow, and I do not think she is a profitable dairy animal.

Q.—What do you mean by dual purpose?

A.—Plenty of milk and plenty of beef.

Q.—You have not found that yet?

A.—No, I have not. Some claim that they have, but I have not. In one district the dairy business is treated the same way as poultry are treated. It is being left entirely to the women of the house, simply as a side line. They are not into dairying for profit, but they seem to be content with a little milk and butter and cream to use on their own table.

You will find similar things in practically all our fifty-six Associations. At Cownsville, Quebec, 165 cows gave 80,000 lbs. of milk in August, and in another Association not one hundred miles away were 29 cows giving 19,000 lbs. more milk. This is the kind of work we are trying to tabulate, to bring home to you the desirability of dairying in properly carrying it on. These men are feeding for profit, and are weeding out so as to work only with the profitable cows. Over and over again we have found ten cows doing the work of twenty. Fancy what that means, striving the year around with ten cows that are certainly not worth their keep. Ten cows in one district gave 9,500 lbs. of milk; ten cows in another district gave only 7,500 lbs; and 100 cows are doing the work that it takes 218 cows to do over in another district. I found in one district all the cows average 2,900 lbs. of milk and 100 pounds of fat. The farmer was feeding chop all summer, and his neighbor was feeding sixteen cows, and only secured 2,200 lbs. of milk. If they had been as productive as all the cows of his neighbor he would have had 11,000 lbs. more, which would have given him $102 more money for his four months' work. I went over the figures of these nine cows thinking I might get something of interest, and I found that practically half the cows were below the average yield. Roughly speaking, we have in Ontario a million cows, and if half of them are below the average see what it means to the country. It would mean another $3,500,000 in the farmers' pockets if they were brought up to the average. It is not a question of price at all. It is a question of selection and bringing these animals up to the average weight of milk; and that doesn't begin to touch the possibilities that might be accomplished if these good cows were still further improved. It is a question of $3,500,000 more if the cows below the average were simply brought up to the average. In many of the Associations there were scores of cows that went 108 lbs. below the average, emphasizing the need there is for this work of weeding out the poor animals and of making improvement by selection. The average crop of oats in Ontario is about 40 bushels per acre, and the seed growers in 1900 secured an average of 54 bushels instead of 40 and 59 bushels the next year, and in 1902, 73 bushels per acre.

Take the question of good and poor cows in the same herd. For eleven months last year we had thirteen cows whose records were complete for the full eleven months, and the average for the eleven was 3,886 lbs. of milk and 180 lbs. fat. The four best cows gave 4,562 lbs. of milk and 216 lbs. lbs. fat. The four poorest gave 2,721 pounds of milk and 135 lbs. of fat. The average difference was $26.40. Cut that in two; then cut it in two again, and then take off a dollar, and it makes a difference of five million dollars in the Province of Ontario. There are some dairymen who are content apparently to milk a cow nine times in order to get one cent profit. We do not claim that every farmer should have a business college course, or should be a chartered accountant, but I do wish to say that I do not consider the methods of modern dairy farming complete. In fact they are lamentably deficient. There should be some simple system of recording everything in connection with the farming operations, and if that is true it follows far stronger that it should be so in connection with every cow in the herd. It is said by horticulturists

that no two leaves of any tree are alike, and there is a wonderful difference between animals of the same breed and in animals of the same herd. I can point you to two sisters, calved at the same time in the spring, and giving totally different yields at the end of the season. The owners cannot account for it except that nature seeks variety and will have it. If this is so, it is most important to get at the possibilities to each cow in the herd. You do not expect to get very rich milk from a Holstein, yet we have on our records a great many testing from four per cent. right straight through the season. If this be so, why are men content with two per cent.? One cow twelve years old, calved in 1906, gave in the eight months, beginning in January, 863 pounds every month. I wrote to the owner to ask what special treatment she was getting, and he said she was getting no special treatment but she comes of good milk stock. Selection pays and blood will tell. (Applause.) I noticed many cows dodging about in their weights, up one time and down another, and up again, and I wrote to find out how it was; and they all replied in the same way "We can't account for it except the change of milkers." There should be a sympathy between the milker and the animal. Don't look upon milking as a chore, but look upon it as a real profitable work. There is a great room for improvement in this matter of maintaining the milk flow for a long period. In one herd the cows calving in the spring gave only 500 pounds by September, but there were animals in the same herd giving nine hundred and a half pounds and eleven hundred pounds of milk and they are the ones to select to breed from. You will have noticed that dense population and a high development of industry and a high development of agriculture must go hand in hand; they are inseparable. The market gardeners collect in the suburbs of our cities. Close around the city of Paris there are 2,000 acres rented out for $150 per acre rent, and there are market gardeners there who are selling produce to the value of $1,000 per acre. That income is not due to high prices of early vegetables, but is due to the enormous crops of plain ordinary vegetable that they raise. We ought to double the milk of Canadian cows, in the next five years, and if the dairy farmers would take hold of it there is no reason at all why that should not be done. We are not doing what we should by any means. You have all beard of the beautiful island of Jersey. There are only 28,000 acres in all, rocks included. The portion that can be cultivated and devoted to green crops and grain and permanent pasture is 11,000 acres and they keep 12,000 head of cattle. What do we do here? We have thirteen acres to one cow. In talking about the profit we make from cows, we should take into account rent and taxes and help. There is the interest on the cow. If you have money invested in a cow that money is worth something. There are lots of good dairymen who get 34 per cent. interest on their money by investing it in a good cow; Cobalt will not give you that. There is the decline in the value of the cow or depreciation in bringing of the price for the purchase of her successor. Consider that she is worth $60 when she starts in, and that she will sell for about $12 when she is discarded in six years. Then you must provide for her house, interest, and the cost for caring for the cow. We will credit her with the value of the manure, and take no account of the value of the calf, saying it will go towards the cow's share of maintaining a good sire. We will put interest and taxes at $3.50, decline value $8, interest and taxes all told three dollars and fifty cents, cost of care $12, total $27.00 less value of manure $6.00 that will bring it down to $21.00. We will consider the net profit from two cows in the same herd. These are the exact figures from a herd we have on our records. The first cow gave 8,300 lbs. of milk, or 350 pounds of butter fat, making a total value of $99.55; and

the average cow, and what is considered a good cow, gives a total return of only $56.85. It cost thirty dollars to feed that cow last year, which leaves $69.55 in the one case and $26.85 in the other case, and if you bear in mind the other expenses $21 for the up-keep, we bring the profit of the good cow down to $48.50 and for the average cow down to $5.85. That is to say, that the good cow gives eight and three-tenths as much profit as the poor one, and if a man is aiming to get a thousand dollars of profit from such stock he would have to keep only twenty cows of the good kind, and he would have to keep 171 of the poor cows to get that same amount of profit. I do not think I can put more plainly to you the object lesson of the comparison between these two cows. It simply means that if a cow renders $50 profit upon the cost of feeding, you would need twenty to make $1,000, and if she only gave $5 profit you would need two hundred.

I want to say that it is absolutely necessary to know by some system of records, just what each cow is doing. It is absolutely impossible for Government officials to reach every farmer in Canada. I want every farmer to take up this matter of cow testing until we can get such results as I have outlined. (Applause.)

The CHAIRMAN: I am sure the address of Mr. Whitley's has been a very profitable one, and one that the dairymen here present can quite understand. I hope it will prove of great benefit to them in the future.

HON. SYDNEY FISHER, Minister of Agriculture, Ottawa: In response to your Chairman's invitation to say a few words this afternoon I feed rather like an interloper. My name is not on the programme until this evening's meeting, and I came in this afternoon to listen to what was going on and try to get in touch with the progress of this great dairy convention. I cannot resist the invitation to say a few words to such an audience as this. This is my first visit to this part of the great Province of Ontario. I have heard for many years of the beauty and fertility and richness of the county of Prince Edward, and of the prosperity of the town of Picton, and I was glad of the opportunity of coming from Ottawa to pay this visit and to see what I can of the people of the place. Coming down from Trenton I was delighted by the many beautiful and prosperous homesteads and splendid barns and the number of good horses and cattle in the barn-yards. You are also evidently an orchard county. I understand you have here a large number of the best equipped and best operated fruit and canning factories in the Province of Ontario. We have a new law with regard to that which it is the duty of my Department to administer. I feel therefore in close touch with this country and with this meeting. I was very glad his afternoon to have the opportunity to see you as you listened to the address of Mr. Whitley on this subject of cow testing. It is one in which I take a deep and personal interest, because I think perhaps I may claim I originated the work in Canada and I look upon it as a most important work. We have for many years in Canada been in the fore-front in the manufacturing side of the dairy business through our instructors, and through our dairy schools we have reached a high pitch of perfection. Unfortunately when we come to study the statistics, as I have had to do for many years, we have found that a large number of cows that are milking in Canada the year around are giving a very small average production of milk. If we look at the other great dairy countries which are our rivals in the market of Great Britain, we find Denmark and Holland are away ahead of us in the amount of milk produced per cow in these countries. I do not think, however, that in any of these countries, and I have travelled in both of them, the natural conditions for dairying are as good as they are here. In these countries they have cows which

have been bred and selected for milk production. We have here just as good stock, just as good breed for the selection of our production, but in the average production we are away behind. Some years ago Gov. Hoard, of the State of Wisconsin, started in to try and test the cows belonging to the patrons of his factories, and he found such great varieties and such great losses on the part of many people that he was induced to publish the results in *Hoard's Dairyman*. I read these reports, and I was so struck with it, that I felt here was an opportunity and a means by which we might improve dairying in Canada. To-day our lack is more milk. For several years back we have been exporting to Great Britain. We have been increasing these exports, but not as we should. How can we increase our productions? We can do it best by increasing not so much the number of cows as the amount that each cow will give. If all our cows were as good as the best cow Mr. Whitley spoke of this afternoon we would have millions more in the pockets of the dairy farmers of Canada, and there is no reason whatever why all our cows should not be as good as that best cow. It takes very little more work to look after a cow which gives $99 of production than for a cow which gives $50. I am sure after such tables and such facts as Mr. Whitley has been able to give, you will take hold of this subject and begin to test your cows. We have been forming Associations through the country for this purpose. I think Mr. Whitley mentioned fifty-two Associations which were in operation this last year. I am very much encouraged by the progress of this work. We have been doing it now two years. In order to support the work this coming season I feel that the farmers themselves must pay a portion of the cost. We have been paying all the costs up to the present time, and it has now got to the point where it would not be right that the Government should pay all the cost. The farmers should pay some slight share of the cost but not the whole of it; and I therefore had Mr. Ruddick communicate with the members of this Association, and I am glad to say we have had a very thorough and a very generous response to the requests that they should contribute twenty-cents per cow, or in no case less than one dollar for five cows. This will not cover the cost of the test, but will help in the right direction. It is right that the public chest should be called upon to experiment for the public benefit, but when it comes to the business of the people themselves it should be paid for by the people themselves in farming as in any other operations. We have one of the best readymade organizations for carrying on this work in the factory Associations in the country. There are no men more interested in the advance of milk productions than are the makers at our factories and we will pay the factorymen who will make this test five cents a test. It sounds a small sum, but when it is continued through the season and a large number of tests it will amount to a reasonable sum. I am satisfied with the results as shown in the reports of what has been done during the last two years. I want to congratulate you on the most auspicious opening of your convention. I understand it is a good while since you were in Picton, and I am sure that this success is evidence that the choice of the locality this year was a good one and that the farmers and dairymen of this district have responded in a way that must make glad the hearts of the officials of your organization. (Applause.)

C. C. James, Deputy Minister of Agriculture for Ontario, being called upon for a few remarks, said: In this very close atmosphere it would be presumptuous on my part to inflict a speech of any length, especially in view of the very important subject yet to be presented to this meeting. I will, however, offer my congratulations to the Association on having the President in the chair to-day. Our Department always felt that the Eastern

Ontario Association would be well conducted as long as Mr. Derbyshire occupied the position of President, and when he stepped out we were exceedingly gratified to have his place taken by Mr. Dargavel. (Applause.) It is the first opportunity I have had of appearing before this convention since Mr. Dargavel took that position. I have been watching the Picton papers for some time. This meeting is not a matter of momentary impulse; we have heard of it for more than a year. In fact I think it is three or four years since certain persons began to advance Picton as a place for holding a convention. All things come to those who wait, and at last the convention has come to Picton. My curiosity has been much aroused and I have been watching to see whether it was going to be a successful meeting, and I am glad to see that it has met with abundant success. (Applause.)

CHEAP PRODUCTION OF MILK.

By Henry Glendinning, Manilia.

The subject that I am to discuss is that of "Cheap Production of Milk," but Mr. Whitley, who has just preceded me, has given you a good deal of my address. A cow in the hands of the farmer is a machine to produce milk. In any of your factories you will find they put in the very latest machine, provided it will produce the article just at a trifle less cost than the old one. The farmers of the Province of Ontario are not discarding the old machines fast enough. I believe that the dry season that we have just gone through is perhaps not an unmixed evil. I believe that owing to the shortage of food a good many of the old machines that have been doing business on the farms of Eastern Ontario have gone to the canning factories, and in that way it will be a benefit. I consider many of these old cows as simply scrap. Mr. Whitley has shown you what to go by: selection, and the weighing of the milk. I think that is the very best advice that could have been given you, and I am pleased to hear from the Minister that that line of work is to be continued.

I do not intend to say very much about the cow this afternoon. You have been through a very dry season, the cows have been short of grass, and in many barns at the present time there is not sufficient food for the wintering of cows in the way in which you would like to do it. We cannot mend matters at the present time, but I think we can do something for the future. We must lay our plans so that we will be a little better off next year than we were the past year. You will find that the cow gives you the best results when she is turned upon the fresh grass in the month of June. There is no time when she seems to make milk so easy as at that particular time. Why is it that you get such good results? The cows are turned out in the fields, and they have all the conditions there necessary; they have plenty of pure air, plenty of sunshine, pure water and an abundance of very sweet, nourishing, and palatable grass. They are not troubled with flies, and the cow has nothing to do but to produce milk. These are ideal conditions for the production of milk, but unfortunately we cannot carry these through the whole season of the year, and we must try to help out matters by getting as near the summer conditions as we possibly can. People in the eastern part of the Province of Ontario do not do much in the way of winter dairying. They milk their cows six or seven months and let them go dry for the

balance of the season. There were two arguments put up against that: first, the labor question and the next is the feed. I do not believe the labor question is as serious as you imagine. Where you hire your men by the year you are able to hire at a less wage proportionately than you can for a few months in the summer. Most men want to hire their labor for eight or nine months, and consequently their wages are away up. That man has to board with some person during the winter, and he eats up a great deal of his summer's wages in that way. In a case of a man hiring by the year, he gets them at a reasonable figure for the twelve months; the man has a home for the whole year, and at the end of the year he is a great deal better off than if hired only for eight or nine months. In our section a great many work only in the summer months, start over in the spring just where they had been the year before, but the man who works for the twelve months always has an increase in his bank account.

We have not very much chance to raise the price of our goods at the other end, but we have an opportunity of producing cheaper milk than we have been getting in the past. I believe it is possible to produce milk cheaper in the winter time than it is in the summer. I know when I make that statement there are a great many people who will question it, and I want to be clear on that point. We have to introduce something into our feed so that it will be as near summer condition as possible. We must have abundance of feed, it must be palatable, it must be succulent, and it must be of the right character and take the place of grass for the production of milk. What can we do that with? By feeding corn silage or roots. Corn silage contains, practically, twenty-one pounds of dry matter in the one hundred pounds; the balance consists of water. Grass runs along just about in the same percentage of dry matter that corn silage does. June grass represents thirty-five pounds; that is, when it is at the state for cutting at the blooming stage. Sometimes it runs down as low as fifteen or even less. Corn silage will give you succulency in food; it will also give bulk, and it is palatable. You will notice that any food which is a good milk producer contains a high percentage of protein. June grass in the green state contains about 3 per cent., red clover hay contains a little over 6¾ per cent., white clover hay contains about 11½ per cent., and wheat bran contains a little over 12 per cent. If we want to get a good milk producer, we can always pick upon it by looking at the column known as protein, and when we see a high percentage of that we know that we have the right thing to produce milk. Corn silage is lowest of the feeds so far as protein is concerned, being only .9. Now you say, why do you talk about corn silage being so good? It is good because it is palatable, succulent, and is produced cheaply, but if you want to get milk out of it you will have to feed something else. I believe the silo is not as generally used as it should be, owing to the fact that some man has built a silo, and he fed that and practically nothing else, and not getting very good results from it he became sick of it and talked against the silo. The farmer should feed wheat bran in connection with the silage, and he will get excellent results. Bran has now got out of sight. I do not know what you are paying for it here.

A Member: Twenty-six and twenty-eight dollars a ton.

Mr. Glendinning: I do not think that any of you can afford to pay that for it. You cannot pay that price, and convert it into milk at a profit. It may pay indirectly in the way of keeping up your cows, but it does not leave you very much profit. We have to get the protein in some way. One hundred pounds of milk contains a little less than thirteen pounds of solid matter, but out of that thirteen pounds there are three pounds and six-tenths

of protein, so that you see there is a very large percentage of protein in milk and you must put protein into the cow. You could not get milk or protein in milk from putting corn silage alone into the cow any more than you could get wheat flour at a mill by putting saw-dust into it. Alfalfa hay contains nearly as much protein as bran per ton. One hundred pounds of alfalfa hay contains eleven pounds of protein, while one hundred pounds of bran contains only a trifle over twelve pounds, so that you see that they are pretty close.

Q.—Do you mean alfalfa green or cured?

A.—That is cured, showing twenty-one pounds of dry matter to the one hundred pounds. Of course in the case of green hay you would not have so high percentage, because you would have more water. Now, what does it cost to produce alfalfa? You have told us here this afternoon that the bran costs you as high as twenty-eight dollars a ton. I will give you the cost of producing alfalfa hay on my own farm. I do not live very far from you, and I hope to be able to show you next summer if you come out to visit me. I can put alfalfa hay into the barn at two dollars per ton.

Q.—You haven't any to sell? (Laughter.)

A.—No, sir; I have not. I never sold but half a ton of hay in my life, and I waited four years for the payment for that hay. (Laughter.) I can put it in the barn at two dollars per ton and pay a rental of four dollars per acre for it, and that is as much as an ordinary farm is worth. An average crop of alfalfa in three cuts per year will run from five to six tons per acre.

Q.—Dry hay?

A.—Yes.

Q.—The majority of the land around this country is not suitable for growing alfalfa? It is too wet.

Mr. GLENDINNING: I know there is a lot of land in this country that will not be suitable, but you know this is an Eastern Ontario convention, and I am talking to the people of Eastern Ontario. Where water does not not stand on the land it is all right, and there are a lot of people who say they have tried it. In one instance I had one good crop, and it disappeared from my land afterwards, and it will not succeed in that field, but that didn't deter me one bit. If I had given up growing alfalfa some seven or eight years ago, I would have spoken against it. I have been at it ten or eleven years, and I have not said anything about growing alfalfa until last year. I wanted to make sure of my ground, and I now feel that I can grow alfalfa with greater certainty that I can grow red clover. I know you can grow red clover in this county, and if you can grow red clover you can grow alfalfa just as well as I can.

Q.—Tell us how right now?

A.—In the first place I say do not sow it on low, wet, mucky ground. get it on high dry land, and where there is sufficient roll to carry the water off so that it will not form ice. If the land is covered with ice the plants will be killed. The soil for growing alfalfa should be good clay loam with plenty of limestone. I have never had any experience with a sandy loam, but I have seen good crops on what I consider light land, and I think it would be well worth trying on sandy loam. The land should be perfectly clean and it should be rich. When I pay four dollars an acre rent for land I want pretty good land. Use land that has had a hoe crop the year previous, and where it has been manured; and where you are in the canning business you will have lots of that kind of soil. I would not plow that land in the fall of the year or in the spring. That is one of the things I would

not like a man to do on my place. I would take and cultivate that land up in the spring of the year and get a very fine tilth on the surface. I would grow a nurse crop, and I find that the best nurse crop is barley—three pecks of barley to the acre. We treat the seed with nitro-culture. We sow the seed in front of the drill.

Q.—How many pounds of seed?

A.—From fifteen to twenty. When I buy seed I sow twenty, and when I grow the seed myself I sow fifteen. I found I had a better catch with fifteen pounds of home-grown seed than I had with twenty pounds when I bought it. I cannot tell you just why, but that is generally the result. Sow it in front of the drill. Somebody will say you will cover it up too deep. No; you will cover it shallower by sowing in front of the drill than you will behind. When the seed falls in front of the drill, the hoe comes along and throws the seed out in between the two rows of grain. If you sow it behind, the seed falls off over the ground, and naturally goes to the lowest level, and you will find the greatest percentage of seed along with your barley. We give it a cross stroke with the harrow, and a little gets in with the barley, and we have the majority of the seed in between the rows. We roll our land immediately after harrowing, and we hitch the weeder on behind the roller. As the roller presses down any small lumps the weeder comes right along, and rakes up and makes a very fine mulch of the field. In that way we get our best catch and our fields do not suffer with the drouth the same as if we left them finished with the roller. The weeder is not sufficient to rake off any big stones on top of the ground. When your plant commences to grow it comes up between the two rows of grain, and they are not crowded out by the barley plants. The roots of the barley being stronger, reach out and take up the nourishment and the moisture, and if you happen to have the bulk of your alfalfa in the same row these are sure to perish. There is nothing more to do to that field during the year following except, of course, you cut the barley off. This nitro-culture has been known for only a few years. A year ago last spring I put in an eight acre field on the farm that I had bought across the road from my own, and as there had never been any alfalfa grown on that farm, I thought I would try it as an experiment. I sent to the Agricultural College at Guelph and obtained the culture. It comes in a bottle, enough in each bottle for a bushel of seed. It consists simply of some gelatine in a little ounce bottle, and the directions come with it telling you how to use it. I also sowed a portion of the field with seed that had not been treated, and that portion of the field was very sickly looking stuff. The line between the two was as marked as if it had been plowed, and the portion that had not been treated reminded me of the first alfalfa I had grown on the home farm. They were small sickly plants. We did not cut three crops last year owning to the dry season. I believe what has caused failure in alfalfa more than anything else is the pasturing of it. It will not stand pasturing, it will not stand tramping, and it will not stand close cropping. I have a field that has been cut for five years. The gate-way is right in the centre of the field, and where we drive in to cut the crop the plants have become thin and short, and you can understand that if it won't stand tramping in the most favorable weather, at the time of making hay, what would it be in the fall of the year when it was wet. My advice to any person who wishes to break up a field of alfalfa would be to turn in your stock in the fall of the year and pasture them there. Every time a colt takes a bite out of the centre of a plant it becomes a dead plant, and if you allow them on it during the winter it will be like an ash bed and you will have no trouble plowing up the alfalfa field if you follow that plan. (Applause.)

Q.—Is there any nitrogen that goes into the ground when you plow it up?

A.—Just the same; it is left in the ground.

Q.—How do you cure the first cutting?

A.—It is a little hard to cure. Our plan has been to cut in the forenoon, and ted it once in the forenoon and again in the afternoon; then, about four o'clock, rake it up and put it into small coils and let it stand there three or four days. If the weather is good at the end of three or four days you can spread these coils out and draw it in to the barn. Perhaps showers come along, and in that case it will take longer. There is one thing you want to be careful about: If you allow these coils to stand in the field too long they have a tendency to destroy the plants under the coils. It is a good thing to have a couple of men go along with forks and draw the coils on to another place. When we come to the second and third cutting it is very easily cured. We cut in the forenoon, ted it twice, rake it up towards evening, and let it lie in the winrow over night. Next morning we put a span of horses on the tedder and ted right up the windrow, and then put the hay loader on in the afternoon and take it right into the barn. Our best hay is secured from the second and third cuttings.

Q.—Why is it they do not advocate growing alfalfa hay?

A.—Because they cut the hay down and let it dry up and when you put the tedder on the leaves fall off.

Q.—Would there be anything in the state of maturity at which it was cut?

A.—Yes, if they allow it to get too ripe. We cut it just when it is coming into bloom, when one-tenth of the blossoms are on. If you allow it to go too far it will become weedy.

Q.—There are different kinds of alfalfa?

A.—There are different kinds, but I don't think there is much difference so far as the quality of the hay is concerned. I think, as far as we have gone in Ontario, we have practically had one kind.

Q.—What rotation do you have?

A.—You could not rotate with alfalfa. You must cut your rotation out because it is too valuable to plow up. A man who has a good field of alfalfa would make a great mistake to plow it under.

Q.—What experience have you had in raising seed, and which crop do you take it from?

A.—I only grew seed one year. We used the second cutting for seed. I might say that from a commercial standpoint I do not know that the average farmer will make a great success of growing alfalfa seed.

Q.—Where would you recommend a man to send to get good alfalfa seed?

A.—We have to depend upon our merchants in the country. I found that when I wanted to buy alfalfa in Toronto I had generally to make a trip around to all the stores before I could get something that suited me. Much of the alfalfa seed contains rib grass.

Q.—What is rib grass?

A.—Another name for it is Buckthorn and the English Plantain. In England they sow it for sheep pasture. A great many fields of red clover have it; some call it wild timothy.

Q.—We have lots of it here, and they do not know it?

A.—It has long narrow leaves, a little short head, and the blossoms are quite conspicuous. It resembles timothy except that the leaves are long like a leek leaf. It has a brown seed that looks like a little canoe.

Q.—When you cut that crop of seeds did it injure the plants?

A.—The next year we had the biggest crop we ever produced, and the next year the fields were bare all winter, and I was afraid my alfalfa would disappear in the spring, but it came out favorably.

Q.—How many years was that after the first seeding?

A.—That was the third year. The second or third year is about its best.

Q.—Do you manure your meadows?

A.—We do some, not always. We give our alfalfa a coating of about three loads of manure to the acre every third year.

Q.—How about seeding wher you have alfalfa five or six years and break it up?

A.—In that case I would not bother with nitro-culture, because you get the same effect by taking some of the soil from an old alfalfa field and scattering it over the field.

Q.—Is there any danger of the sub-soil being too hard if it is not plowed in the fall or spring?

A.—No, we want a subsoil firm, and when you get alfalfa on it will give it a soil better than you have had before.

Q.—How deep a seed bed do you give?

A.—Two or three inches, but make it fine.

Q.—How do pigs do on it?

A.—They do well.

Q.—How would oats do instead of bran?

A.—They cost too much, and they have not got as much protein in as bran. For summer soiling there is nothing that I know of as good as a field of alfalfa.

Q.—How will alfalfa stand the drouth?

A.—Better than any of the well-known clovers, because it is deeper rooted. Of course it suffered this year with the dry weather as well as the other clovers. The second cutting was short.

Q.—How much cheaper can you feed alfalfa than bran?

A.—I think twenty pounds of alfalfa hay would be good for a cow with silage. Now twenty pounds of clover hay would have nearly the same amount of protein as twenty pounds of bran would have. Twenty pounds of clover hay would cost you two cents. Eighteen and a half pounds of bran would cost you nineteen cents.

Q.—Will a cow get as much out of it?

A.—I will tell you something I learned on New Year's day. The man who has charge of my stable is a sort of autocrat. He said to me, "There is a cow and she freshened on the last week of June, and she is giving practically as much milk now as she was any time in the summer." He milked the cow, and I got the scales and weighed it, and I went back at night and weighed it. I found that the most that cow ever gave was twenty-eight pounds in the summer, and that is not a very big yield. She was a Jersey cow. On New Year's day she gave twenty-five pounds, and what did she get? Corn silage, and some oat straw, cut with corn silage, because we are trying to spread it out this year, and fifteen pounds of roots, and she had alfalfa hay. She had not one morsel of grain or bran of any kind, except the grain that grew in the corn. Now, I leave that to yourselves. The cow gives twenty-eight pounds in July, and on New Year's day six months afterwards gave twenty-five.

Q.—I suppose that cow is worth $200.

A.—She is worth $200.

Q.—What is the average test of that cow?

A.—Her average test for July was 4.4, her test for December was 5.2. She is making more than she was in July. She would give me 8.62 lbs. a week, or nearly 8¾ lbs. of butter fat; and allowing 15 per cent. for over-run, she would make close on to ten pounds of butter. Taking her twenty-five pounds of milk on New Year's day, at a percentage of 5.2 butter fat, she was giving 9.1 of butter fat, or equal to 10.47 of butter, more on New Year's day than she did in the month of July. Of course the conditions are somewhat better. There are no flies to bother the cow in the stable, she is getting all that she will eat of alfalfa hay and corn silage with a few roots.

Q.—Do you know what it costs to produce a pound of butter?

A.—I have not figured it out, but it would be an easy thing to do, supposing we feed her 40 pounds of silage that costs $2 per ton. Take that for thirty days it would be $1.20, fifteen pounds of mangels at six cents a bushel would cost us 45 cents for a month, twenty pounds of alfalfa at $2 per ton would cost sixty cents a month. The total cost of the month's feed for that cow would be $2.25. 271 pounds of butter in the six months at twenty-five cents a pound would be $67.75, that would give me $54.25 profit for six months.

Q.—Do you think you can cut alfalfa hay, and put it in the barn for $2 per ton?

A.—Yes, I can put it in for less. I took an eight acre field that I had in alfalfa hay, and I will consider an average crop will be five tons to the acre. I charge $4 an acre for rent, that would be $32, and ten hours cutting $3. I am considering a man hired by the year with a team of horses, and I do not think it costs me $3 a day. I put nine hours tedding twice, at $2.25, using one horse 4½ hours; raking at $1.15; cocking and turning out cocks, $5; two teams and four men, for hauling $8; one man in the mow $1.50, and one horse and boy $1. That is $53.90 putting in the first crop. Then I allow three tons of hay to the acre for the second cutting, and as there is then no rent to pay, that costs $11.15. I am only asking 1½ tons to the acre for second cutting. The third cutting costs $10.50, and I am only asking ¾ ton to the acre. In these three years' cuttings I will have 43 tons to the eight acres, and will cost me $75.35.

Q.—Did you ever try to seed it down with timothy?

A.—No; by all means keep timothy and other grass away from it. Some people sow red clover with it, but it is not much better.

MORE ADDRESSES OF WELCOME.

At the evening session of Wednesday the First Methodist Church was packed by farmers and townspeople. A splendid musical programme, interspersed the speeches. The Mayor of the town presided.

Rev. Vernon H. Emory, pastor of the church gave a brief but hearty address of welcome. He said:—I am the son of a farmer. There are a few things in my life that I am proud of, and that is one of them. We sent you, as members of the Association, a unanimous invitation to hold the evening sessions in our church building. Personally, I believe that the church is broad enough to open its doors to every legitimate thing in which its members are interested so personally. I have no fear whatever, in plac-

ing the auditorium at your disposal. I may say we are proud of our church, and we are proud of you, and we hope that your stay in our town will be a very pleasant one, and abundantly promote the interests which your Association have at heart. (Applause.)

Dr. Morley Currie, M.P.P.: To extend a welcome to friends would be easy; it would be easy to extend a welcome to relatives; it might not prove to be so easy for us to extend a welcome to these great leaders of the country. I must say, I feel is is difficult to extend an adequate welcome to this great agricultural and industrial association—the greatest industrial association of this country, and I say so advisedly. I do not mean the magnitude of its productions alone; I mean also, the greatness and depth of its conception. When we look back to the nineties, we find a small band of men in Germany, who said we will apply every principle of art and science to the industries of Germany, and we believe we will get results. The result was, that the commerce and manufacturing of Germany was multiplied, as you all know, twenty fold. This Association has reason to be proud of the fact that we have amongst the farming community of the country, men who had a broad conception, and who applied the principles of art and science to the dairying business. They had the courage of their convictions, and they went on and put their ideas in force. Not only have they made a great industry, but they had made contributions to it. The expert work of the chemists, the observation of bacteriologists, the work of the mechanical engineers, and those who are best versed in our best structures, were brought to their assistance. And the wonder is, although these pioneers in the cheese industry had this foresight, the manufacturers of this country are just beginning to get on a level with them. Other manufacturing industries are twenty times behind the times. You can go to the canner, and you can say, if you know at all, tell me what is the effect of passing an uninterrupted current through a can of corn, will that destroy the bacteria, just as heat will? And he will not know. Ask him if he has got a satisfactory corn-husker? No, he has nothing satisfactory. Ask him if he knows what a strong current of air will do to carry off the corn husks? And he will say, "We have never tried it." I believe, in this case, as in many others, there will be found that the main stone in the building of our national edifice has come from the rough quarry of the common people of the country, and for these reasons I have no adequate ability to express a welcome to such a great Association. When you have crossed the Harlem river into New York to the Island of Manhattan, it may have occurred to you, as it occurred to me, there are so many contrasts between going to the Island of Manhattan and coming across to Prince Edward county. As you cross to this Island you are surrounded by the blue depths of the clear water in contrast to the greasy water that surrounds Manhattan, and when you come in here you have the fields and flower-beds where you have something pleasant to the eye. Coming into New York you have ill-ventilated streets and sky-scraper buildings. In comparing the two places you find one similarity and that is, we have erected a sky-scraper in the country of Prince Edward greater than any in New York. It is bounded only by the confines of the whole county and I hope none of you while you are here will discover the vertical dimensions. That sky-scraper we have erected to-day is the hearty welcome of the people of Prince Edward County to the Eastern Dairymen's Association.

Senator D. Derbyshire: I am sure we must all be delighted with the very warm welcome we received in this important city, because it must be a city and the county itself must be made all of towns, from the description we have heard from our good brother Dr. Currie. (Laughter.) I am sure

e must be very much pleased not only with this reception to-night but with he reception we had in the practical part of our work to-day in the other all. We have been particularly delighted with the way we have been eceived and the kind attention we have been given by your good Mayor. t is only a few years ago since we had any influence with the Government. t is only a few years ago that we did not have any money voted by either lovernment in connection with the dairy work in this great Province of)ntario. It is only a few years ago since a few struggling men took hold f this business and went heart in hand. We were bound to make it go, and 'e made the Ontario Government give us grants and we made the Dominion lovernment walk right to the front and give us shipping facilities, which hey seemed very glad to do, and I am delighted that at present time, with- ut going through the history of all these years, we are now getting grants nd we are making the best article of cheese that is made the world over. Jow we are d lighted with the way we have been able to do all this work. t is only a few years ago since we went to Chicago and took 95 per cent. of he prizes; the people laughed when they thought about Canadian cheese oing over into that great country, the United States. They did not ealize what we were doing over here, but we took 95 per cent. of the prizes or fancy cheese at that great exhibition against the competition of the orld. That was the work of Canadians. (Applause). And we brought fame o the name of Canada, and made every other industry of the land known hroughout the world on account of the products we were turning out. What 'e want now is, to keep still better makers and pay these men so that they an afford to stay in the business. We have with us to-night the Hon. idney Fisher, Minister of Agriculture for the Dominion, who gave us efrigerator cars to carry our goods to Montreal and refrigerator apart- ients on the ships to carry goods to the old country, and then efrigerators at the other end to hold the goods so they would not spoil efore delivering to the customers. We feel proud of the work we have one, and we feel proud of the money, $101,000,000 we received for butter nd cheese and bacon in 1906. This means more money than we ever got n the history of the country, and every industry was flourishing last year n account of this additional money. Our business in Picton to-day and for he next two days is to educate the men so that they will produce better uality of milk and larger quantities, and get it to the factory in better ondition, and this year make $10,000,000 more than we ever did before, nd we can do it if we only try. We want $10,000,000 more money in 1908 han we made in 1907, and that would mean that every spindle in every actory, every store-keeper, and every man in the Dominion would be bene- ited and every industry would be floated at high tide, and this grand Domin- on would take another step in advance on account of the educated dairymen.)on't make any mistake: Every industry rests upon your intelligence, and 'e ask you to co-operate with us and assist us this next year in making this usiness a grand success, and we will have a proud record in the way of pro- ress. I am delighted with your reception, and thank you very much on ehalf of our Association.

SOME AGRICULTURAL DISCOVERIES.

By C. C. James, Deputy Minister of Agriculture, Toronto.

As Mr. James arose to address the meeting he was presented with a eautiful bouquet of carnations by Miss Tottie Hepburn, whom he gallantly

kissed. He then said: Occasionally I am apt to feel embarrassed, and if it were not for the fact that I have at the back of me my good friend, the Senator, I do not know how I would be able to conduct myself on an occasion of this kind. This, I think, is the first occasion upon which the Association has been housed as it is to-night. We have met many gatherings in connection with this Eastern Dairymen's Association. I do not think we have ever had a larger, more representative, and shall I say more respectable looking audience than we have here to-night. (Applause.) Someone might question, perhaps, the propriety of holding a session of the Eastern Dairymen's Association in a church. Well, if it is not fit to come into a church it is not fit to continue its existence anywhere. I can simply say that, from all I have seen and known of the Association, you need have no fears at all about admitting them into your place of worship. Senator Derbyshire's remarks as to the importance of agriculture and dairying called to mind a little incident which I noticed a few weeks ago, just at the time of the financial crisis in New York. I took a train at Niagara Falls and at once found myself in the company of four men who were strangers to me; but, apparently, from their talk, they were business men coming to Toronto from the United States. They appeared to be men of means. The conversation very soon drifted into the peculiar financial conditions, and one man said: "Well, somehow or other, I am not very much concerned about this. You know, I never get really afraid of a financial crisis until I hear there has been a failure of crops." That, I think, preaches its own sermon.

Thirty odd years or more ago I was quite a small boy, and I remember starting out from home with my mother at what at that time I looked forward to as a very, very extensive trip. We left Napanee, county of Lennox and Addington, and soon after crossed into Prince Edward county, and although I was very young at the time I have a very distinct recollection of going first to one farmer's house and stopping there for awhile, and then going on to another, and then being taken to another, and so on. And I enjoyed myself thoroughly, as only a boy can. The farm houses were comfortable, well situated, had good orchards and all these attractions which appeal so much to children. Finally we came in over the road to the town of Picton. Years afterwards I asked questions, and I found out as we went along from place to place we were simply going from one relative's place to another, and I have come to the conclusion since that I must have been able to claim relationship to perhaps, a majority of the people of the county of Prince Edward. When I learned that the Eastern Dairymen's Association had decided to come and hold their annual meeting here, in the old town of Picton, I felt sure they would be amply repaid. Thirty or thirty-five years is a long time; yet, after all, in the history of the people it is a very short time. And those of you who go back and compare the farms of to-day with the farms of that day must see what a wonderful change has taken place. Agricultural conditions have been much changed in this country, and nowhere, perhaps, to a greater extent than right here in the township surrounding the old Bay of Quinte. The kind of farming carried on at that time is no longer practised. Methods that were then in vogue have been discarded, and new methods adopted. Changes that have come over agriculture are not confined to your county or your experience, but, wonderful changes have been going on all over the country.

A few years ago the discovery was made that agriculture was, like every other kind of industry, controlled by forces directed according to certain fixed laws; and that, after all, there was for this agricultural work a scientific basis. It seems rather remarkable that this industry, which necessarily

has been part of man's work ever since man was upon the earth—because ever since man has been here he has had to produce his food by toil, and agriculture has played the principal part in the production of his food—it seems strange that until recently it was not found out that his work is controlled and directed by fixed laws and regulations the same as any other industry. Formerly there were only one or two books on some phase of agricultural work. You will now find them scattered broadcast all over the country. Where formerly there was no school teaching agriculture, we have now in every state of the Union and every Province of the Dominion, agricultural colleges—institutions devoted to the teaching of the science underlying agriculture. That was the first step towards an awakening of modern agriculture—when it was recognized that agriculture was not a matter of mere chance, that it was not a business controlled entirely by the weather or by that mysterious Providence behind which so many people hide themselves; but that agriculture was, after all, controlled by scientific principles, and that the men who knew most about it must get down to the study of these principles.

After this first step had been taken, after agricultural colleges had been built and facilities had been provided for giving instructions, associations like the Eastern and Western Dairymen's Association and the Fruit Growers' Association were organized. And they stood back and said: "We have the knowledge; come to us and we will instruct you. We will tell you all that we know." The next discovery made was that that would not do at all; that the people would not come. And the whole thing had to be revised; and they had to go out from the college and the association, teachers and instructors, and seek the people. It was the case over again of Mahomet and the mountain. In order to succeed, the information had to be taken to the farmers.

The next discovery that was made was that in going out to seek farmers, dairymen, poultry men and fruit growers, through the Farmers' Institute, they were going to the men of mature years, the older men. On looking over the magnificient audience that we had in the Parish Hall this afternoon and in listening to the addresses, I could not help remarking that the majority of the men in that audience were men of mature years; they were in fact, men of more than mature years. I almost suspect there were a great many men in that audience who were beyond the years of applying the information that had been given them.

Having found out that we must take the information to the people, we have next come to this discovery that we have been taking the information to the men of mature years we began to revise the order of things. We erected in the towns throughout the Province, schools; but we did not grade these schools from the old people down, but, from the youngest up. Now we have found that the work that has been carried on in this country and other countries, through the Farmers' Institutes and through our other organizations, has been directed largely towards the older elements in the community. We have been working over the heads of the younger people. We have brought little or nothing to the young men, and very little to the middle-aged men. That is a discovery we are just making in these late years. We have got to find the solution to that question. Whether it deals with dairying, live stock or poultry, we must take it to the young men and the boys; and we must not allow them to pass the receptive age before we lay before them this great and important work.

There is another discovery that has come still later, and it perhaps surprises us to learn that these discoveries are so patent. The last discovery we have made is this: That the farmer, after all, is himself of the least

importance: that that farmer has a wife and has a daughter. Through all these years we have overlooked that fact, and have neglected them. We have built our Agricultural Colleges for the young men. We have formed Dairymen's Associations for the men, mere men. We have our Fruit Growers' Association—men again. We have our Agricultural Societies, controlled and largely built up by men. And through the whole agricultural organizations of the country, women to a large extent have been left out, have been neglected, and we have been working for the farmer just as if he was an old bachelor living all alone by himself, making his own clothes, getting his own meals, and living entirely to himself. Don't you see that in doing this work we have overlooked the fact that the whole farm life is kept going not so much by the father, by the son, or brother, but by the women. We have just awakened up, and made this discovery that in every farm house in this country there is a woman at the head of affairs, and in most of them one or two daughters, and we have organized Women's Institutes. You talk about the progress of Farmer's Institutes; it is nothing in comparison with the way in which the Women's Institutes' work is going ahead. Suddenly the women of the farms of this country have found out there is somebody taking an interest in their work, and that they count for something, although they have been carrying the heavy load of the farm work. You know the old saying:

"Man works from sun to sun;
Woman's work is never done."

This is particularly true in the farm homes. The farmer's wife and daughter have found out for the first time in their history, that outside of the little church organization, outside of the quilting bee, or paring bee, there is something coming into her little world which promises to improve it, which promises to bring fresh life into her existence and fresh hope, and which promises to raise her up and put her on a equal standing with the men in this community. I do not think you have found out in this section of the country what this new movement means. Where it has been started in the western part of the Province, the women have assisted it eagerly, and they are developing it to the greatest possible extent; and I tell you that the home work of this country is a matter of great consequence to the future of our people. Humanity is more bound up with the conditions of the home life of this country than it is with our schools or our churches. (Applause.) And if we can improve the home life through the Women's Institute we will be starting the leaven right in the centre of the lump. So long as we neglect the home we cannot expect the church, the school, the college, or any of these secondary organizations to work out to their full that which they might accomplish. (Applause.)

BACK TO THE FARM.

By Hon. Sydney Fisher, Minister of Agriculture, Ottawa.

Hon. Mr. Fisher was also presented with a magnificent bouquet of roses by little Miss Ina Hepburn, whom he took in his arms and kissed. He said: This is indeed a welcome to the town of Picton, and to the county of Prince Edward, which warms the heart and makes one feel at home. This is the first time I have had an opportunity of coming amongst you; and I am glad indeed to have it even at this winter time. I think everybody I have met to-day has said to me: "You should come in the summer to see

he beauties of our country and our town." I would be glad indeed to come n the summer, when I am sure this rich and fertile country and this pros-erous town would look very beautiful; but, I do not want to wait until ext summer to come amongst you, and I preferred to come this winter. udging from what I see in the winter time, I think if I were to come in he summer I would not be able to tear myself away; I would have to resign he work in which I am called upon to do in other parts of this agricultural ountry and settle down here in this, one of the gardens of the land. Let ne here congratulate not only Mr. Derbyshire but the country and the Sen-te on the fact that the old-time President of the Eastern Dairymen's Association of Ontario has been translated to the Upper House. (Applause.) t falls to my lot to put agricultural legislation through the House of Com-nons, and I have often felt that I would like to have somebody thoroughly ersed in agricultural matters with that winning way and with that appeal-ng power that your former President has to help that legislation through he Senate. Now, Senator Derbyshire, I am going to throw on your shoulders he work of helping me to carry through the upper chambers of Parliament whatever is necessary for the farmers of this country. (Applause.) The Senator has told you of the excellent work of the Dairy Associations in his Province. I do not come from the Province of Ontario myself, but, come from another Province which is not so far advanced in agriculture, nd I have looked to the Province of Ontario for inspiration and to the 'arme s of Ontario for information. We are a broadly extended land, from he Atlantic to the Pacific, covering three thousand odd miles of territory; nd if in any one part of the country there is some slight falling off in our gricultural success, the greater success in other parts of the land more han makes up for it. There has been continual, steady progress amongst h> farmers of Canada for many years back. This year however, has been ne, I think, which has been almost universally hard for agriculture. I annot remember any year in which in every part of Canada, with some light exception here and there, the farmers have had a harder year. Yet, notwithstanding the almost universal hardship of it, I am glad to say that Canada has come through it well; and her financial condition and her com-nercial prosperity is sound to-day when our neighbours and other countries are tottering and uncomfortable. (Applause.) This is, no doubt, largely lue to the fact that for a number of years back we have had unprecendented gricultural success. Mr. James has told you this evening the way in which our agricultural progress has been maintained. He has told you how our farmers have taken hold of their business and made progress all along the line. I venture to say there is not a part of the Dominion of Canada that has benefited so much by investigation, by experiment, by teaching and example as the farmers. Our industrial situation is not so good. We have technical education in agriculture, but, practically no technical education in any other branch of our social system. We have been told to-day what has been done for the farmers in the way of technical education; and if to-day the farmers are making progress it is due to these things more than anything else. I find a great many people in the cities complained that they have to pay so much for the things that the farmers produce. I am constantly told that butter is an outrageous price, and they have to pay forty and fifty cents a dozen for eggs, and that bread has risen in price, and if they want fowl they have to pay double the price that they paid a few years ago. I am not going to dispute the facts. I hope they are true. I am glad that the prices of our agricultural products are so high. I am glad for the farmers (applause), and I am glad for the whole community. You

can quite understand why I should be glad for the farmers, but you cannot understand why I should be glad for the rest of the community. Let me say, that if to-day the farmers are getting the best of it, they have only just come into their rights. For a generation or two we farmers have had a hard road to hoe, and they have had to take the brunt of the financial burden; and it is time that in a turn of the wheel they should be on the uppermost side, and I am glad that they are at the present time a little nearer the top. Why should I be glad for the rest of the community? This is a little more difficult to explain, and I will ask you to bear with me for a few minutes. Why is it, that last season, butter was higher in Montreal, Toronto and Ottawa than it was in Liverpool and London? I think I can give you an explanation.

During the last generation in Canada, as in the United States and some other places of the world, there has been a steady drift of the population from the country to the cities. Our census, and the census of the United States, has shown an abnormal increase in European population, and nothing like a comparative increase in our rural population. Why has this been the case? In the first place, because the city people have greater opportunity for enjoyment, an easier life, and greater reward for their toil; and the result has been, the young farmer boy and girl see their city cousin much better off than themselves. When they come to manhood or womanhood they try to get to the city if they possibly can. Mr. James said a few minutes ago that he found the gathering largely composed of men of middle-age or older. Why is that? Because to a large extent young men have been leaving the farm, and have been going to the cities, and have been taking the girls with them. Why have they gone? I cannot believe that it is because they live in the centre of a city with nothing around them but brick and mortar. I do not think that that is any temptation to a man to leave the beauties of the country life with the green fields and beautiful trees and the sparkling water as it tosses around in the creek. I cannot believe that they prefer the smoke and vitiated atmosphere, and the heat of the great city. But yet, they go there. Why? First, because they think they can make more money there. And apparently they do, and have been doing for years back in Canada and the United States; and the result has been a steady increase in our city population at the expense of our rural population. How does this account for the fact that the price of food has got high? It means that there are more people in the city to consume that food and fewer producing. And although the agricultural machinery and improved methods still enable a fewer number of farmers to produce as much as a larger number used to, still to-day there is a greater number of mouths to fill, of people who do not produce food at all, who are engaged in commercial operations and on our railroads, and our ships. That does not account altogether for the whole of it, but it accounts for a great deal of it. There is another thing which accounts for a considerable part of it, and it is that our country is becoming more prosperous. Money is more plentiful, and people are living better, and more people are eating the luxuries of life, and eating more of the necessaries of life than they used to twenty-five, thirty, and forty years ago. There is another reason why butter is so high: it is much better than it used to be. I remember the time very well, if I went to a country hotel or to an ordinary restraurant in the city, I had butter put before me which I did not want to eat, and I got through my meal with as little of it as possible. It was then a rare thing in Canada to find real, sweet butter. But during the last ten or twelve years, that has completely changed, and to-day you can go hardly anywhere in Canada and not find good sweet

utter that tempts you to eat as much as you possibly can of it. The result
that all of you people of Picton, Belleville, Deseronto, Ottawa, Mon-
real, and Toronto are eating pounds of butter where a few years ago you ate
unces of it. It is a good thing for the farmers, and it is a better thing for
ne people who have good butter to eat. And what the people will have to do
to come back to the farm and make a little more of these agricultural
roducts and eat them at home, instead of having them brought into the
ity where you have to pay for them. (Applause.) It is a fashion in Canada
o say that agriculture is the basis of our prosperity. I do not wish to insist
pon it that in a comparatively new country like this, in a country where
e have such a vast expanse of fertile soil calling for cultivation, calling to
e dealt with, that it might produce the food not only for the people of
anada but for the people of all parts of the world as well. It seems to me
pity that that condition of affairs is allowed to continue, and our young
ien and women should turn their attention to other callings, and should
eglect this important calling of agriculture. Mr. James has spoken of the
act that farming to-day has to be carried on by educated men and women.
t is, I believe, an actual fact that here in the Province of Ontario the men
who are doing the best on the farms of this Province are the men who
raduated from the Guelph Agricultural College. We do not want the
eople of this country to grow up in the condition of the people of the
ropics, who simply have to lie on their backs and let the fruit of the trees
all into their open mouths. We want the people to grow up to have to toil
or their livelihood, and to grow up strong, vigorous people, and to make a
reat nation of this continent. The men who have the best education, and
who know how to farm scientifically, are the men who are going to make the
reatest success of their farm life in this Canada of ours. I appeal to any
f you who have left the farm, many of you who have sons and daughters
rowing up in the city. Let them come back to the farm and learn to
roduce the food they eat, and they will be a happier people in time to come,
nd will rear better families out in the country than in the city streets.
They will build up a better nation here in Ontario to hand down to our
lescendants than we have received from our forefathers, and it will be
etter for the work they are doing in the present day. (Applause.)

THE CENTRE OF THE WORLD.

By Thos. McGillicuddy, Department of Agriculture, Toronto.

After making some pleasing local allusions, and telling a couple of apt humorous stories, the speaker proceeded to say: When I was a very small boy, I climbed to the roof of our little house, and there I made a wonderful discovery: That our home was the centre of the world! I told the members of my family and the neighbors about it, but those who didn't say "Nonsense," smiled at me. I stoutly maintained that our house was the centre of the world, and offered to prove it to anyone who would accompany me to the roof, by showing them that the sky came down at equal distance all around it! (Laughter and applause.) That humble abode was indeed the centre of a domestic world—with a limited horizon, it is true—but out from it have gone influences that still vibrate.

Each of us, and all of us, are world centres. Consciously or unconsciously, we are being influenced by, and are influencing one another. Emerson brings this thought out strikingly in his poem "Each and All":

"Little thinks in the field yon red-cloked clown
Of thee, on the hilltop, looking down.
The heifer that lows on the upland farm
Far heard, lows not thine ear to charm.
The sexton tolling the bell at noon
Dreams not that great Napoleon
Stops his horse and lists with delight,
Whilst his files sweep round yon Alpine height.
Nor knowest thou what argument
Thy life to thy neighbor's creed hath lent."

A Centre for Dairy Consultation. Picton is to-night a dairy world centre. It is the Mecca of the Eastern Ontario dairymen just at present, and the pilgrims are indeed a happy, joyful band. (Laughter.) The eyes of the agricultural, commercial, and political worlds are for the time being focussed upon Picton. Those keen young men at the press table will make the telegraph wires hot to-night as they send off their reports to the daily press; and to-morrow morning bankers, merchants, journalists, and politicians, will eagerly scan the papers to see what has been said and done by the men who have gathered at this splendid convention. Why? Because, as the poet has said: "The farmer feeds them all."

Dairying is a Social Centre. This great assembly to-night suggests that the dairy industry closely touches the community on the human side. Every cheese factory is a social centre. Opinions as well as products are there interchanged; minds as well as pocket-books are expanded by factory intercourse. A well-conducted cheese factory in a rural community is, next to the home, the church, the school, and the public library, a social refiner and educator. A beautiful German legend says that the hut of a poor fisherman was changed into a temple of exquisitely wrought silver by a certain tiny lamp being lighted and placed within it. Many of my older hearers have known something almost as marvellous as that to have taken place in our own Province. They have seen the humble log houses of the early settlers quickly transformed into mansions of brick and stone by the advent of the cheese factory. (Applause.)

Modern Dairying is a Scientific Centre. The chemist and bacteriologist have each an ever enlarging field of investigation and counsel in connection with the handling of milk and its products. Adulteration and taints are traced to their origins, and can thus be corrected. Butter and cheese making is being more and more reduced to a science. Technical knowledge that was formerly the portion of the cultured few is now being possessed by many of the skilled dairymen of Canada, and the old rule of thumb has been relegated to the shelf with grandfather's clock. The chemists and bacteriologists who have done investigation work in connection with our Ontario cheese factories have saved the country tens of thousands of dollars within the past seven years, and have done so at a minimum of cost. The farmer of to-day is not scared at the appearance of the scientific professor; he knows that he is a man, a brother, and a friend, as well as a learned specialist.

Dairying is a Manufacturing Centre. The dairyman is a manufacturer. By devising and feeding well balanced rations he helps the cow to make milk more copiously and more cheaply for him, and in that way he is a manufacturer of the increased yield. By co-operating with the cheese-maker the farmer who supplies milk to the factory also becomes a manufacturer of cheese or butter, a finished product in concrete form, and easily handled for the home or foreign market. It is estimated that butter and cheese to the value of $23,000,000, were exported from Canada in the year 1907, and in addition to this a fair portion of the bacon product exported may also be claimed

as a dairy side line. In the county of Prince Edward in 1906, cheese to the value of $586,661 was made. Patrons to the number of 1,916 were paid $521,484 for their milk, an average of $272 a patron. As each patron represents from four or five of a household, this means that nearly 10,000 persons in this small but prosperous county are more or less dependent upon the cheese industry for a living. (Applause.)

Dairying is a Co-operative World Centre. In dairying, as in religion, "No man liveth unto himself." Cheesemaking is the largest co-operative business we have. There are about 60,000 patrons of the cheese factories of this Province. Many of these factories are directly, and most of them indirectly, co-operative in character. My own opinion is that much of the growth of the public ownership idea in Ontario can be traced to the influence of the co-operative cheese factory. It certainly has suggested the possibilities of more generally united action in business matters relating to the public at large.

The dairy world is to be saved and upheld by some measure of faith, and by a very large endeavor along the line of good works.

NOTES ON A SEASON'S EXPERIENCE IN MONTREAL.

By Geo. H. Barr, Dairy Division, Ottawa.

The export trade of butter and cheese from the port of Montreal for 1907 is 2,040,190 packages, valued at $19,635,541. To receive into the warehouses between 20,000 and 30,000 boxes of cheese between 5,000 and 8,000 packages of butter a day, requires extensive warehouse accommodation, and to inspect these goods, and to export between 50,000 and 100,000 boxes of cheese each week requires a splendid system of handling the goods and rapid inspection.

The condition of the butter and cheese upon arrival in Montreal would indicate that during the hot weather in the summer there should be some system of controlling the temperature on the river boats for both butter and cheese, and a more general use of iced cars for cheese, as many of the cheese arrive in a heated condition, especially when shipped in ordinary box cars.

The Government cargo inspectors report very great improvement in the condition of the cheese boxes last year compared with former years. Still there is room for much improvement, as many of them arrive in a broken condition, and even after being coopered they present anything but an attractive appearance as they are being loaded on the steamer. The butter boxes are fairly uniform in style, but they are often not as clean as they should be.

There is room for very great improvement in putting on the factory brands, and weights of the cheese. Many of them are indistinct and put on any old place on the boxes, giving them an untidy appearance. There are still two many pencils used instead of stencils for marking the weights.

There are immense sums of money being spent in equipping the warehouses in Montreal with the most modern cold storage facilities for butter and cheese. At some of the warehouses, the cheese are put directly from the drays into cool rooms where the temperature is about 45 degrees. There are still some warehouses, however, where the cheese often stand for days where the temperature is almost as high as outdoors and the quality is injured considerably.

It should be the duty of every salesman to acquaint himself with the facilities each warehouse has for taking care of the cheese properly. I am of the opinion that the system of inspecting cheese and butter, which is generally adopted in the warehouses of Montreal, is not in the best interests of the trade, not is it as fair to either buyers or sellers as it should be.

All inspection or examination of butter or cheese after it is sold should show as far as possible the actual quality of the whole lot. This is impossible under the general practice in the warehouses, of testing a percentage of the packages, selected at random and judging the quality of the whole lot by the result of this examination. I believe the inspecting at the present time is done fairly and as accurately as it is possible under the present system, but it is not done as thoroughly as it should be and can be done if the factories would adopt a uniform and honest system of marking the cheese from every batch or vat, and the butter from every churning. If this were done, it would then be possible to select one package from each vat or churning and when these were examined, an absolutely correct indication of the quality of the whole lot would be obtained, without injury by unnecessary use of the trier. It often happens that the cheese from one vat or the butter from one churning is very inferior in quality, while the rest of the shipment is quite up to the standard.

When the inspection is made under the present method, one or two of these inferior boxes or packages may be in the number examined and the whole lot is rejected, but if each batch or churning were numbered, the packages representing the inferior batch could be easily set aside and the reduction in price figured on the actual quantity of inferior butter or cheese instead of being averaged for the whole lot.

Let me give a couple of instances that happened during the past season. I was called upon to examine a lot of 31 packages of butter which were rejected on account of the flavor. No fault was found with anything else. A representative of the creamery being present, I asked him to pick out five packages for me to examine. I found two in the five with a strong, leeky flavor, and, of course, put the lot second grade. I said to the creamery man: It is just possible there is only one churning with that flavor, but we cannot try every package." He found out from the maker that this was the case, and immediately bought a set of rubber stamps and has numbered every churning since. The merchant made a cut of one-half cent a pound on the lot, amounting to $8.68, which was equal to a little over three cents a pound on the five boxes which were wrong in flavor.

The other case was on cheese. Five boxes had been examined, and two were found wrong in flavor. When I went to look at them, I saw the batches were numbered, and asked to see a box of each batch and found all the batches but one, fine. The two cheese the inspectors found wrong had the same number. The merchant was pleased to know that he had a fine lot of cheese when the five inferior ones were picked out.

I found quite a number of such cases later on in the season when quite a few of the factories in Quebec were making batches. The numbers may be put on with half inch or three-quarter inch rubber stamps and should be put near the factory brand.

If the cheese is made in two vats at the factory, the first day's make would be marked 1 and 2, the second day's make, 3 and 4, and so on up to the date of shipment. Then commence again with No. 1. The churning of butter could be numbered in the same manner.

I found the chief defects in the cheese which I examined as follows: Nearly 90 per cent. not clean in flavor; 60 per cent. open and loose in texture; 33 per cent. acidy and mealy; 29 per cent. too soft or weak in body; 22 per cent. uneven or too pale in color; 15 per cent. poor finish, mouldy or stained surface.

It will be seen that "Not clean in flavor" is the chief defect, and is due, no doubt, largely to taints in the milk. Yet frequently the flavors appeared to be caused by the use of bad starters and impure water at the factories. There were very few cases where defect in flavor could be described as "food-flavors." In the spring, a number of lots had a weak, leeky flavor, caused probably, by the cows eating leeks.

Loose and open texture, which is the next greatest defect, appeared to be caused by leaving too much moisture in the curds, either by insufficient cooking or not stirring the curds sufficiently when the whey is removed and by salting the curds too soon.

Acidy and mealy texture is a very common defect, and is usually due to too much acidity in either the milk or curd, and by the use of too much salt on the curd.

Soft or weak body is a defect very common in the extreme eastern part of Ontario, and some districts in Quebec. Insufficient cooking of the curd and leaving an excessive amount of moisture in the curd after the whey is removed, not only gives a soft or weak body, but often injures the color as well. Quite often the color was mottled by mixing in old curd, especially about the time the cows were going out on the grass in the spring, and again in the late fall when they were beginning to get any food.

The following figures will give a fairly good idea as to the size of the factories which are turning out inferior cheese. In most cases the number of boxes in each lot represents a week's make of cheese.

6.5	per cent.	of	the	lots	examined	contained	over	100	boxes
93.7	"	"	"	"	"	"	under.....	100	"
83.3	"	"	"	"	"	"	"	70	"
43.7	"	"	"	"	"	"	"	40	"

It must be remembered that these were cheese which had been suspected or objected to by merchants. Bearing in mind that about 98 per cent.* of the total lots examined were second and third grade, it will readily be seen that the great majority of our inferior cheese come from small factories. It does not necessarily follow that fine cheese cannot be made in small factories, but it is true that the best men cannot be secured to operate them. It requires men with decidedly greater ability to manage a large business than to manage a small one, and just as long as we have small and poorly equipped factories, just so long will there be weak and inferior cheesemakers in them, and one of the solutions for doing away with a great many of our second and third grade cheese is larger factories, with strong and capable men to operate them.

*See letter of J. A. Ruddick following discussion of this paper.

Now the defects in our cheese and butter are not so very serious. We are not making a whole lot of third grade and cull goods, but as Canadians, we are making too many second grade goods.

With the splendid system of instruction at the factories and creameries, the dairy schools, the dairy literature and information distributed by the different Governments, dairy papers and dairy meetings, there is no good reason for ignorance regarding any line of our dairy industry.

What we need is, that each one, from the boy who brings up the cows from the pasture, to the man who puts our cheese and butter on board the steamers for Great Britain, shall do his work in the very best manner. Will you do it?

Mr. AYER: Mr. Barr is the farmer's friend in Montreal, and he gives the merchants blazes. (Laughter and applause.)

The CHAIRMAN: You have a good time now to thresh this matter out. If any of you have any complaints to make, or desire any information, ask for it right now or forever after hold your peace.

Mr. E. A. CALNAN: Many of our factories are equipped with cold storage, and we believe we put out a first-class cheese, but sometimes they do not arrive in Montreal in first-class condition, and we would like to know if there is any weakness in the cold storage at any point along the road?

Mr. BARR: I think that in Prince Edward County you ought to ship carefully. Have your cheese shipped to Montreal in refrigerator cars. I saw some of the cheese from this county last year during a very hot spell, and I found that the heads of the cheese were very much more open in Montreal than they were in the factories. If these cheese had been sent down in an iced car instead of by river boat, I think the conditions would be different. You have to be as careful in making cheese if they are cooled in a cool-curing room as you have in any other place. Do not try to leave a lot of moisture in the curds and think because you have a cool-curing room you will get nice meaty texture.

You must not think because you have cool-curing rooms that you can let up in any way in the matter of making. Be careful that they are delivered in Montreal in the best condition.

A MEMBER: Do you think the cheese are hurt more by being drawn on wagons six or eight miles in the sun than they are by going up on the boat? I have seen a good many cheese shipped from this port that I think were taken the best of care of while on the boat, but standing here in the sun I think they were hurt because there was no cover on the wagons.

Mr. BARR: These are things you will have to be careful about. There is no use keeping cheese in cool-curing rooms and then taking them out in the sun at temperature of 90° and then sending them down in a boat and keeping them two days at a temperature of 70°. Of course, boats are cooler than box cars, but you must be careful in the transportation of your goods.

Mr. JOHN MCGREGOR: Don't you think there should be more prompt delivery taken of the cheese? There is a great deal of time lost in Montreal in taking delivery. I have seen cheese stand on the waggons there for hours after they had been loaded.

Mr. BARR: Yes, that is true. Last year, especially, it was very difficult to get delivery of the cheese in Montreal on account of the strikes. I hope we will not have another season like that. These facilities will keep getting better. We will have the sheds at the docks in better shape and switches laid in on the docks into each shed. What Mr. McGregor says is only too true, especially in the C.P.R. yards. They are so crowded that they are scarcely able to handle the dairy products as they should. They do not get delivered as quickly or in as good shape as they do on the G.T.R., but they are trying to overcome these things.

The PRESIDENT: When you make out a report on cheese you make out a blank and you state the trouble and what is the matter.

Mr. Barr: I put on each certificate the defects in the cheese, and I try as near as I can to point out what I think is the cause of these defects. I often write to the cheese inspectors, both in Quebec and Ontario, and tell them what I think about it, and then they immediately get their inspectors out to these places.

The President: In the forepart of your remarks you mention that some of the warehouses were not in a proper state for taking more of these cheese. You intimated that it would be rather a delicate thing for you to name these warehouses.

Mr. Barr: I won't do it.

The President: If you are going to lay the blame on the cheese maker would not it be just as fair for you to locate the trouble in Montreal as to locate it in the factory? (Applause.)

Mr. Barr: Take some cases where the cheese are delivered, say on Tuesday, and they stand in the warehouse till the next Tuesday at a temperature of 50 or 60 or 70. You cannot expect these cheese to be in quite as good condition in a week's time as they were when they came in; and that is just what I mean. It is rather a difficult thing to know just what to do.

The President: You can never cure a patient until you diagnose the case, and find where the trouble is.

Mr. Singleton: Would it be possible for you as official referee where you are called in to give each lot a thorough examination? The system of taking off five of the first lot does not seem to me to be a good system. Have you time to make a thorough examination?

Mr. Barr: Not at the present time, but if you were numbering each batch of cheese, the warehousemen would have instructions to set aside a box of each number. Now they do not set aside any particular cheese; they pick them at random. There is no system of picking out each batch, and when I come to examine, I have got to examine them on the same basis as the inspector. I always look at some of the cheese the man inspected, and I look at others as well. I have to examine them on the same basis as the man who inspects them in the warehouse, and I must confess that I do not feel in my heart that I know exactly what one lot of cheese is like. I do not think any inspector in Montreal does; he has a pretty good idea, but that is all he can have.

Mr. Ayer: I am very much obliged to Mr. Barr for bringing up this fairness, and we never will have fairness unless we have that done.

The President: Why not pass a resolution on that subject right now; it is very much in the interests of the cheesemaker?

Mr. Ayer: I am very much obliged to Mr. Barr for bringing up this pet theory of mine. Until you adopt this plan of numbering the vats, just as they number the churnings of butter, you will never get a fair plan, but when that is done every merchant in Montreal will leave out one cheese of each number. Suppose you are making eight cheese in a vat, you will have eight cheese marked "1"; and if you have nine cheese in the next vat, you will have nine cheese marked "2," and if you have seven cheese in the third vat you will have seven cheese marked "3," and the next morning you will start with number 4, 5, 6 and so on.

One other point is the shipment in cars and by boat. Now I know the steamer "Alexandria" quite well—I see the captain here in the audience. He is sometimes blamed for a lot of the trouble, but I would rather have the steamer "Alexandria" in the worst day I could get it than to have a common box car on a hot day. The boat is not as good as a refrigerator car, but it is a mighty sight better than a box car.

The PRESIDENT: Would not it be a good idea to have all the vats number so and so?

Mr. D. M. MACPHERSON: I think you will find some difficulty in that regard: you not only make so many cheese of a certain vat each day, but there is every day in the week. There must be something to determine the day of the week as well as the vats. I think there should be some means of determining the number of vats in each day.

Mr. AYER: If you have 142 vats in your shipment the last vat will be 142.

QUALITY OF CANADIAN CHEESE.

The following communication which appeared in a well known Toronto weekly journal, explains itself:

To the Editor of the Sun,—Mr. Geo. H. Barr, a member of the staff of the Dairy Division, who was official referee of butter and cheese at Montreal last season, in speaking of his work at the recent dairy convention, held at Picton, Ont., made the statement that "only 2 per cent. of the cheese which he examined were of No. 1 grade." This statement has been widely quoted as showing a serious condition in the Canadian cheese trade. As there is nothing in the statement itself or in the facts of the case to warrant such a conclusion, I ask your permission to making the following explanations:

As Mr. Barr explained in his statement, he examined less than half of one per cent., or about one lot out of every 200 lots of cheese received at Montreal during the season, and further, as he was asked to examine only those lots which were suspected of being inferior in quality, or which had been condemned by the purchasers, it is not surprising that only two per cent. were first grade. The showing is a remarkably good one rather than a bad one. As a matter of fact, the quality of Canadian cheese never stood as high as it does at the present time. More improvement has been made in the last year or two than for many years previous. The writer has just returned from a lengthy visit to the markets of Great Britain and can speak with confidence on that point.

J. A. RUDDICK,
Dairy and Cold Storage Com.

OTTAWA, Ont.

REPORT OF CHIEF DAIRY INSTRUCTOR AND SANITARY INSPECTOR.

By G. G. PUBLOW, KINGSTON.

It is with pleasure that I present to you my annual report as Chief Dairy Instructor and Sanitary Inspector for Eastern Ontario.

As a result of the passing by parliament of a sanitary law regarding the conditions surrounding the manufacture of dairy products in Ontario, it has become necessary this season to make a complete change in the system of inspection and instruction. Owing to the fact that all places wherein dairy products were being manufactured were to be regularly inspected by a sanitary inspector, it was decided by the Department to combine the work of inspection with that of instruction.

Syndicate.	Instructor.	Factories.	Full day visits.	Call visits.	Patrons sending milk.	Patrons visited.	Factories paying by test.	Samples tested for adulteration.	Watered.	Deficient in fat.	Amount of money from fines.	Fermentation tests.	Percentage out of condition.	Percentage of patrons with good facilities for cooling.	Factories improved.	Expenditure in new buildings and improvements.	Factories with cool-curing rooms.	New factories built.	Factories with milk testing equipment.	Makers qualified to test.	Factories making whey butter.
											$					$					
Alexandria	A. McDonnell	37	57	160	1,067	35	4	1,020	2	5	120	700	75	5	25	2,000	....	....	9	15	....
Almonte	W. J. Ragsdale	39	79	139	1,892	169	3	1,509	8	....	100	287	72	20	39	8,000	....	....	39	10	1
Belleville	Hugh Howie	41	55	214	2,119	137	....	4,500	1	....	.....	86	100	20	20	7,700	6	....	10	5	....
Brockville, E.	A. H. Wilson	49	94	103	1,777	83	3	1,154	2	....	50	616	40	75	28	13,665	....	3	7	5	3
Brockville, N.	P. Nolan	47	103	209	1,197	82	....	2,522	2	2	65	762	15	50	25	6,460	1	3	7	7	1
Brockville, W.	S. S. Cheetham	41	102	156	1,028	136	5	1,094	16	7	140	363	55	10	38	18,480	2	4	8	6	....
Campbellford	R. T. Gray	39	79	181	1,661	121	....	1,807	5	2	25	277	40	50	14	5,000	1	1	6	10	....
Chesterville	L. A. Zufelt	40	43	318	977	146	14	120	1	....	75	90	20	50	17	1,200	...	1	5	15	....
Cornwall	J. Buro	36	32	377	1,200	100	17	395	3	2	.....	100	50	30	35	8,765	....	1	26	12	2
Finch	C. B. Larry	39	104	231	1,327	254	....	542	3	....	.....	931	50	20	17	1,117	....	....	8	2	....
Kemptville	W. G. Gardiner	47	100	144	1,741	134	10	672	3	4	50	150	62	10	25	5,845	....	1	12	10	1
Kingston	H. Brintnell	38	92	89	1,327	242	...	1,165	5	3	70	195	85	15	16	5,000	....	1	20	7	1
Lindsay	D. J. Cameron	35	42	168	2,035	176	5	594	.....	.....	.....	38	50	2	25	1,500	....	....	18	19	....
Madoc	J. B. Lowery	39	56	118	1,195	129	....	95	1	....	10	141	85	10	29	11,632	2	3	12	5	....
Morrisburg	C. W. Norval	41	36	346	1,230	100	2	431	5	1	.....	236	8	80	21	1,500	....	1	14	10	1
Napanee	Geo. Bensley	43	45	285	3,500	250	....	1,500	4	2	75	117	25	10	38	15,000	4	3	15	9	....
Ottawa	W. W. Dool	37	41	167	984	20	7	614	6	1	168	.....	....	50	15	2,700	....	....	19	18	....
Ottawa, E	I. Villeneuve	40	75	223	1,300	200	10	1,850	8	4	45	501	90	10	33	4,325	....	2	6	4	....
Ottawa, W	R. E. Elliott	39	40	170	2,000	50	1	700	....	.....	.....	102	45	50	21	1,850	2	....	19	25	....
Perth	J. H. Echlin	38	39	155	1,587	72	....	2,930	1	3	30	101	29	30	11	6,750	....	3	22	28	2
Peterboro	R. W. Ward	37	37	354	1,796	387	11	115	1	....	.....	74	30	21	37	6,798	3	.. .	20	25	2
Picton	C. A. Publow	36	30	273	2,961	112	....	1,840	1	....	.....	228	50	50	27	11,900	14	2	18	18	....
Plantagenet	J. Charbonneau	51	47	258	1,209	59	2	1,780	5	7	150	204	57	5	24	5,060	1	....	10	14	....
Vankleek Hill	W. G. Graham	46	73	184	1,518	175	1	1,432	2	21	115	725	40	10	25	1,615	....	....	5	5	....
	Totals	975	1,501	5,022	38,583	3,369	95	30,681	85	64	1,288	7,024	....	.....	605	153,862	36	29	335	284	14

To give the instructors the independence that it was considered advisable they should have, and as an inducement for makers to take advantage of instruction, the services of the instructors were given free of charge. This enabled them to devote as much time as they found necessary at any particular place to make the required improvements.

This year the number of instructors was reduced from twenty-eight to twenty-four, and the territory, which comprises all that east of Toronto, and in which there are 975 cheese factories, was divided into 24 districts with about 40 factories in each. Over each district was placed an instructor whose duties were to visit each factory to see that it was kept in a clean, sanitary condition and provided with a pure water supply, to give instructions in the manufacture of cheese, and where it was found necessary, to visit the farms of any patrons who were delivering milk which was found to be out of condition; and to test milk for adulteration where factorymen had good grounds for suspicion that the milk was being tampered with.

The men engaged for this important work were cheesemakers of long experience in the management of factories and who held a diploma from one of our dairy schools.

Rather than weary you with an account of the individual work done in each district, I have prepared a tabulated statement, showing the names of the factories in each group, with a summary of the work accomplished by each instructor.

From this summary it will be seen that 975 factories were regularly visited, and of this number 178 received instruction and inspection for the first time. Full day visits to the number of 1,501 were given, and 5,022 call visits, making a total of 6,523, or an average of over six visits to each factory. It will be understood that full day visits were made only at the request of the maker or factory manager, and, with the exception of their duties as sanitary inspectors, the services of the instructors are altogether optional. It is expected, however, that when makers are in trouble they will acquaint their instructor with the fact, and invite him to render them what assistance he can in overcoming their difficulties.

It was our intention at the outset that the farms of all the patrons should be inspected, but it soon became necessary for the instructors to devote so much of their time to assisting the makers in matters pertaining to the manufacture, that this was found to be impossible, and only the farms of those who were delivering milk out of condition could be visited. There were 38,583 patrons sending milk to the factories in the 24 groups, and to personally visit the homes of all these would require more time than could be devoted to this work by the limited number of instructors.

7,024 fermentation tests were made (of samples of milk of doubtful quality) to determine the condition of the milk, and about 75 per cent. of the samples tested were found to be out of condition, either by being overripe or of bad flavor.

The farms of 3,369 patrons were personally visited by the instructors, to see if the causes of these defects could be located at the source of supply, and many more would have been visited had it not been that many of the patrons delivered their own milk. These visits revealed the fact that 90 per cent. of the defective samples were delivered by patrons who gave little or no attention to the cooling of the milk or the sanitary conditions surrounding its production. While there is a general improvement in the condition in which the milk is being delivered at the factories, not more than 50 per cent. of the patrons have appliances necessary for efficient cooling during the warm weather, or give little or no heed to the sanitary conditions under which the milk is produced.

30,681 samples were tested for adulteration; 85 of these showed added water and 64 were deficient in fat, this number being 131 less than last year. The amount of fines imposed on the offending parties amounted to $1,288. This is one of the most disagreeable features of the instructor's work, and I think they should be relieved of it, as it takes up a great deal of time that could be spent much more profitably. The remedy for this lies in the paying for milk according to quality, which I consider the proper thing to do; for it would remove the tendency to dishonesty, and would also encourage the production of milk of better quality. But this cannot be done until factories adopt the system of paying by test, and this would appear to be a long way off, as only 95 factories in Eastern Ontario are doing so at the present time. Thus it will be necessary to still give attention to the testing for adulteration. I think it would be well to have men appointed specially for this work, whose duty it would be to look after the testing and prosecuting. As it is at present, the prosecuting is left in the hands of the factorymen. Generally speaking they do not wish to deal with the matter, and many cases that should be dealt with are allowed to go by default.

It is very gratifying to be able to report a very marked improvement in the condition of the factory buildings and surroundings. While there is yet a great deal to be done in some of the districts in the way of improving the sanitary conditions, yet on the whole, the factories were never in such good order as they were this season.

Twenty-nine old factories were replaced by new ones and 605 made improvements in different ways. The estimated value of the expenditures, including new buildings, was $153,862, which is $33,874 more than in 1906.

With very few exceptions the factorymen responded quite readily to the recommendations made by the inspectors; in fact many of them spent more than the profits from their business would warrant. While a considerable portion of this amount was spent in improving the curing-rooms, yet there are only 36 factories that have what are known as "cool-curing rooms," or facilities for controlling the temperature at all seasons, and 17 of these are to be found in the Prince Edward district. This is a matter that is worthy of much greater attention from factorymen than it receives, as the having of these conditions makes it possible to turn out cheese of much superior quality, for which I am glad to know that the buyers have been paying more than the ruling price this season; and besides, it gives the factorymen an independence in many ways that he does not otherwise enjoy.

Notwithstanding the more critical inspection by the buyers this season, the May and June make of cheese was reported as the best in the history of the trade; but as soon as the warm weather set it, general complaints were received regarding flavor, texture, and closeness. The openness was largely due to insufficient maturing before salting; the coarseness in texture was largely due to the too heavy salting of the curd and the receiving of over-ripe milk and the treatment given in its manufacture, the makers in many cases being forced to receive milk of this character owing to the keen opposition that exists between factories. As long as makers will continue to accept milk in this condition it will be practically impossible to overcome these defects. Very little complaint was made about the finish and boxing of the cheese, and there has been a marked improvement in this respect. In the districts where the whey was returned in the milk cans from whey tanks that were badly located or not properly cleaned, the greatest number of complaints regarding flavor was received, and while a special effort has been made by the instructors to have these conditions improved, owing to the lack of knowledge by the milk producers of the principles of

fermentation, it was difficult to have them realize the necessity for the care that it was asked should be given to the tanks and whey. While I believe the whey tanks to be the most fruitful source of contamination at the factory, it was the one improvement which met with more opposition than to all the others asked for. It would appear as though one or two things would have to be insisted upon: Either that the necessary care be given to the tanks to keep them perfectly clean, or that the whey be pasteurized, and the latter would appear to be the most effective remedy. In several factories that were having bad flavor the trouble was located in the water supply. Whenever it was suspected that the water supply was contaminated, and before parties were asked to go to the expense of providing a new supply, samples were sent to Dr. Connell for analysis, and the result of his investigation was given to the persons responsible. Many samples of milk, whey and cheese also were analyzed by the Doctor, and this we found of great assistance to us in locating and dealing with many bad flavors and other defects, of which Dr. Connell will likely deal in his report.

While it is true that the laws governing these conditions are quite plain, it was thought best by the Department that the court should not be resorted to until every effort had been put forth, through education, to acquaint the people with the requirements of the law, and as a means of accomplishing this, a series of special district meetings have been held, numbering in all during the season, 26. These meetings had an average attendance of 130. A report was given by the local instructor of the conditions as they existed in his district, and the conditions were clearly and forcibly discussed. I believe that this will be a great factor in bringing about the improvements necessary for another year. Right here I would like to take the opportunity of expressing my very hearty appreciation of the services rendered by the Directors of this Association, in connection with these meetings, as to their untiring efforts is largely due their splendid success. A further means, and one which should prove very effective, is the supplying of speakers by the Department, as far as possible, to the annual meetings of all factories that make application. Some 210 of these have been attended up to January 1st, and as the majority of the annual meetings are not held until after this date, it is expected that a much larger number will be attended before the opening of another season. There is no doubt that these meetings will prove a great factor in bringing about the co-operation between producer and manufacturer that it is necessary must exist before we can reach the standard of perfection at which we aim.

A new feature that was introduced into some of our factories this season, and one that has created a great deal of discussion among the factorymen, was the skimming of the whey and the making of whey butter. At the end of the season some fourteen factories were engaged in this work. I think it is well to sound a note of warning regarding this matter, and I would advise any person who has not a butter plant in connection with his factory to make no provision for any such work until we have sufficient proof that it will pay to do so. It should be understood that the factories that have been engaged in this work were previously equipped for butter making and have been able to enter into the matter without much extra expense, which may have made it possible to carry on the work more or less profitably. My opinion is that where the milk is properly cared for and skilfully handled in the manufacture of cheese, it will not pay to adopt the practice unless the output is very large. Then there is the danger of the making of the cheese being neglected, and the injury that might come to the reputation of Canadian butter, and should the system become generally adopted might require legislation compelling the branding of the butter.

The instructors will remember the season of 1907 as one involving many special duties and which required that tact and good judgment should be used. It is very gratifying to me to be able to report that the work is being carried on without any serious complaints being made. The instructors have been very faithful in their duties and untiring in their efforts in dealing with the difficulties met in their respective districts. They have all succeeded in bringing about marked improvements, and in doing so they have been careful not to abuse the authority given them.

On the whole the cheese were not shipped nearly so green as what they were last year, yet in some of the districts the instructors were seriously handicapped owing to the closeness to the hoops with which the cheese were being shipped, and had to be governed to a certain degree by reports from Montreal. In this respect we received valuable assistance from Mr. Barr, the official referee, from whom I received weekly reports on the quality of all cheese he was called upon to inspect. From this information I was able to keep the instructors well posted and to notify them without delay whenever any of their cheese were being faulted. As a result of this direct information it was generally possible to have the defects remedied in a very short time, and it was seldom that the same factory would be reported on the rejected list two consecutive weeks. I would like to express my appreciation of the splendid service rendered by Mr. Barr in this respect. So long as the present system of having cheese go to Montreal for inspection prevails, I believe it is necessary that we have on official referee at that point, and I am sure that no better man than Mr. Barr could have been selected for the position.

Before closing, I wish to thank the Executive Committee of this Association for the hearty support they have given me in conducting the work of the season, in which more progress has been made than in any previous year.

FACTORIES IN MR. MCDONNELL'S GROUP.

Pine Hill, Dalhousie Mills, Central, Banner No. 1, Glen Nevis, Aberdeen, Pine Grove, Union, Heather Bloom, Glen Dale No. 2, Glen Roy, H. T. 155, Glendale, Glen Gorden, Glen Norman, Fairview, Apple Hill No. 2, St. Raphaels, Picnic Grove, Banner No. 2, Balmoral, Bainsville, Green Valley, General Roberts, Curry Hill, Highland Chief, Glengarry, Western Star, Bridge End, Glen Robertson, Victoria, McLaughlin, Lorne, Dorney, Kirk Hill No. 7, Baltic Corners, Greenfield Union.

FACTORIES IN MR. CHARBONNEAU'S GROUP.

G. 145, Green Bank, 918, Stone Brook No. 1, Stonebrook No. 2, Lot 5, Con. 6, Canada 225, A. F. W., G. 604, 6th Con., Alfred, Empire, Brook Co-operative, Grand River, Canada No. 2, Higher Brook, Canada, G. 871, A. C. 5, Parisien, North Indian, Perfection, Mount Royal, T. W. No. 1, 875, Stafford, Ottawa Valley No. 2, Stone Brook, C. T. No. 3, A. C. 4, G. 868, J. Q. No. 2, F. 32, H. C. No. 2, Ottawa Valley No. 1, C. T. No. 2, Empire B., A 35, Bolt, The Brook, 238, G. 870, O. B., Cobb's Lake, E. L. No. 1, C. W. 5, J. Q. No. 1, Centre, C. T. No. 1, E. T., F. 32.

FACTORIES IN D. J. CAMERON'S GROUP.

Fleetwood, North Verulam, Dunsford, Missing Link, Crown, Hope, Cameron, Bensfort, Cambray, Mount Pleasant, Bobcaygeon, Maple Leaf, East Emily, Hampton, Cavanville, Mariposa, Cold Springs, Ballyduff, Perryton, North Harvey, Seymour West, Omemee, Red Rock, Reaboro, Janetville, Cedardale, Palestine, Baltimore, Star, Fraserville, Orono, Myrtle, North Ops, Darlington, Buckhorn.

Factories in Mr Lowery's Group.

Fraser Creek, McClure, Ormsby, Cold Springs, North Star, Brook Valley, Madoc, Beechmount, Faraday, Rose, Bronson, Mayo and Raglan, Limerick, Daisy, Cook's, Spring Creek, Spring Hill, Haliburton, Coe Hill, Vansickle, Hybla, Mayo and Carlow, Millbridge, Deloro, Riverside, Oak Leaf, Cashel, Deer Lake, The Ridge, Green View, Walkerville, Eldorado, Marmora, Alexandria, Queensboro', Bangor, Lake View, Champion

Factories in Mr. Bensley's Group.

Deseronto, Kingsford, Sheffield, Moneymore, Fifth Lake, Centreville, Farmer's Friend, N. E. L., Odessa, Ideal, Napanee, Palace Road, Forest Mills, Clareview, Albert, Bellrock, Camden East, Phippen No. 1, Excelsior, Bayview, Elm Grove, O., Selby, Croyden, Maple Ridge, Enterprise, Moscow, Metzler, Phippen No. 2, Emerald, Collin's Bay, Empey, Union, Newburg, Tamworth, Marlbank, Whitman's Creek, Petworth, Wilton, Phippen No. 3, Stella, Cataraqui, Glenvale.

Factories in Dr. Publow's Group.

Glen View, Quinte, Bloomfield, Union, Royal Street, Elmwood, Acme, York, Salem, Edville, Hyland, Wellar's Bay, Union Vale, Waupoos, Ben Gill, Maple Leaf, Rogers, York Road, Colborne, Massassaga, Cherry Valley, Cloverdale, Black River, Bethel, North Port, King, Cedar Creek, Wicklow, Mountain View, Allisonville, Cressy, Point Travers, Elmbrook, Bayside, Wooler, Brighton, Grafton.

Factories in Mr. Howey's Group.

Thurlow, Bronk, Thomasburg, Rock, Marble Spring, White Lake, Sidney Town Hall, Otter Creek, Foxboro', Moira, Cloyne, Shannonville, Silver Spring, Premier, Stoco, Bogart, Glenn, Frankford, Kaladar, Ketcheson, Eclipse, Mountain, Rosebud, Roblin, Murphy, Victoria, Roslin, Zion, Boundary, West Huntingdon, East Hastings, Melrose, Moira Valley, Cedar, Clair River, Tweed, Plainfield, Sidney, Union, Beulah, Halloway.

Factories in Mr. Brintnell's Group.

Hinchinbrooke, Mount Hope, Mountain Grove, Forest No. 1, St. Lawrence, Cold Spring, Excelsior, Latimer, Sydenham, Desert Lake, Parham, Arden, Elm Dale, Ontario, Gilt Edge, Sand Hill, Battersea, Railton N. 2, Harrowsmith, Frontenac, Maple Grove, Long Lake, Wolf Island, Arrigan, McGrath's, Duff's, Perth Road, Hartington, Mountain Vale, Harlow, Reynold's No. 2, Silver Spring, Sunbury, Corn Flower, Model, Railton No. 1, Reynold's No. 1.

Factories in Mr. Norval's Group.

Glen Becker, Fairview, E. W. No. 28, Elma, Oak Valley, Haddo, Model No. 3, Glen Stuart, Edwards No. 2, B. C. No. 1, Central, Toys Hill, E. W. No. 5, E. W. No. 3, Carlyle, F. F. No. 1, St. Lawrence, Model No. 2, Matilda Centre, Edwards No. 5, G., Matilda, Mountain View, E. W. No. 6, Morrisburg, Hesse's No. 1, F. F. No. 2, Matilda West, Model No. 1, Maple Hill, A. A. L. No. 1, Spruce Grove, Bouck's Hill, E. W. No. 15, South Matilda, Ashton's No. 1, Pleasant Valley, Minto No. 1, E. M., Edwards' No. 1, P. and L., Strathcona.

Factories in Mr. Echlin's Group.

Fallbrook, Lanark and Drummond, Ardoch, Bathurst Mutual, Watson's Corners, Tennyson, Tayside, D. and L. Union, Boyd's, Scotch Line, Parkhill, I. X. L., Plevna, Drummond, Mississippi, Roland, Middleville, Clayton, Elite No. 3, Drummond and Elmsley, Harper's, Rosedale, Wensley, Zealand, Maberly, Clyde, Old Ferry Road, Oso, Star, Balderson, Stanleyville, Fernleigh, Brooke, Hopetown, Dalhousie Lake, Elphin, Joe's Lake, Vennachar.

Factories in Mr. Elliott's Group.

Admaston, Corona, Equal Rights, Glasgow, Huntley Centre, Micksburg, Packenham, Snake River, Queen's Own, Westmeath, Bonnechere Valley, Carleton Model, Elmdale, Greenwood, Kidd's No. 4, Osceola, Rankin, Thistle, Victoria, Stonebrooke, Beachburg, Diamond, Forester's Falls, Gold Medal, Maple Hill, Pine Grove (Mc), River View, Union Star, Woodlawn, Jackson, Cobden, Dirleton, Grattan, Hazledean, Madawaska, Pine Grove, Shady Nook, Union Pride, Waba.

Factories in Mr. Gray's Group.

Trent Valley, Braen, Ryleston, Spring Brook, Evergreen, Plum Grove, New Evergreen, Dartford, Harold, Centreton, Empire, Prince of Wales, Stanwood, Bell, Stirling, Avon Bank, Norham, Now Model, I. X. L., Castleton, Kimberly, Crow Bay, Maple Leaf, Enterprise, Shamrock, Monarch, Percy, Seymour West, Burnley, Brickley, Forest, Hoard's, Spry, Kingston, Central, Codrington, Beaver, Woodlands, Spring Valley.

Factories in Mr. Cheetham's Group.

Caintown, Warburton, Junetown, Tilley, Gem, Taylor, Escott Union, Marlbank, Rockport, Selton, Escott Centre, Lorne, Fairfax, Rose Hill, Pine Grove, Wilson's No. 1, Springfield, Wilstead, Woodburn, Gananoque Jct., Cheeseboro', Anglin, Granite Hill, Marble Rock, Maple Leaf, Rapids Valley, Gananoque, Morning Star, Mallorytown, Pine Hill, Mallory's, Leeds County, 1,000 Islands, Aberdeen, Cold Brook, Lansdowne, Jackson, Keenan & Sons, Central, Howe Island, Sand Bay.

Factories in Mr. Ward's Group.

Round Lake, Apsley, Oakdale, Pine Grove, Star, Daisy D., Lang, Roseneath, Keene, Glenalda, Young's Point, South Burleigh, Westwood, Stoney Lake, Victoria, Oakdale, Villiers, Fenella, Maple Leaf, Clydesdale, Lakefield, Trewern, Oak Lake, Killarney, Indian River, Ormond, Otonabee Union, Warminster, Chandos, Warsaw, Selwyn, Trent Bridge, Norwood, Shearer, Shamrock, Central Smith, North Dummer.

Factories in Mr. Ragsdale's Group.

Maple Hill, Mayberry, Rockspring, Farmers' Friend, Rideau Star, Prospect, Lombardy, Mississippi Pride, Farmers' Own, Carleton Place, Montague Centre, Old Fairfield, Island Queen, Valley Queen, Reliable, E. W. No. 20, Maple Valley, Newbliss, Ashton Union, Rideau Queen, Willow No. 2, Union, Orchard Valley, Lone Star, Crystal Spring, Golden, Maple Leaf, Appleton, Kitley, Roseville, Independent, Irish Creek, Standard No. 1, Elm Grove, Pure Gold, Black's Corners, Rosebank, Mount Zion, Clear Spring.

Factories in Mr. P. Nolan's Group.

Newboro, Model, Crosby, Glendower, Centreville, Elgin Model, Gilt Edge, Morton, Long Point, Spring Vale, Ardmore, Black Lake, Mapleton, Westport, Forfar, Fish Creek, Bedford Mills, Bush Model, Smith's Valley, Island City No. 2, Ideal Canada, Rockdale, Cedar Bridge, Fermoy, Lake View, Portland, Ontario, Tichborne, Maple Grove, Seeley's Bay, Island City No. 2, Grand Central, Cold Glen, Mountain View, Clear Lake View, Plum Hollow, Crow Lake, Farmers' Pride, Myer's, Salem, Dominion, Clover Hill, Home Factory, Lyndhurst, Gold Medal, Mapleton, Lake Opinicon, Green's.

Factories in Mr. Villeneuve's Group.

Sunny Side, Levesque No. 2, Cambridge, Grassland, Casselman, Riceville, Farmer's Joy, Aurora, Ettyville, Diamond, Midnight Sun No. 4, E. W. 27, Levesque, Russell No. 1, W. S., G. 124, Mayerville, Nation River, Pendleton, South Indian, St. Albert, E. W. 29, A. 46, C. P. Brisson No. 1, L. No. 1, St. Onge, St. Adrien, J. D. 8, G. 557, J. B. No. 1, Cambridge No. 5, R. No. 1, L M G. No. 5, R. No. 2, B. B. No. 1, Midnight Sun No. 1, St. Isidore, J. D. 9, Boundary, Russell No. 2.

Factories in Mr. Zufelt's Group.

Daisy, Ault's No. 1, Ault's No. 5, C. W. No. 3, Levesque, C. W. No. 2, Berwick No. 2, Fraser No. 1, White Globe No. 2, King, Dundas Star, Ault's No. 2, McLean's No. 3, Smith's Hill, White Globe No. 1, Lorraine No. 1, Central Co-operative, Fairbank, White Globe No. 4, No. 854, W. P., Ault's No. 3, Lorraine No. 2, Ellis No. 1, White Clover No. 5, R. B. No. 1, W. 15, Riverside, E. W. 7, Chesterville, No. 534, Ault's No. 4, M. U. F. No. 1, Ellis No. 2, C. W. No. 1, Berwick No. 1, E. W. 8, M. P F., E. W. 9, Crysler.

Factories in Mr. Buro's Group.

Farran's Point, Farmer's Lee, McDonald's Fancy, Lake View, Glendale, McGillivray's Bridge, Cornwall Gems, May's Fancy, Royal, Wales, Sweet Brier, Lilly White, St. Andrew's, Black River, Star No. 1, Glen Donald, McMillan's Corners, Glencoe, North Branch, Moulinette, Glen Walter, White Rose, River Bank, Cornwall Creamery, Farmer's Pride, Aultsville, Martintown, Glen, Burnbrae, Farmer's Choice, Glengarry Creams, Silver Lily, King's Road, Lunenburg, Island, River Rasin.

Factories in C. B. Larry's Group.

Gallingertown, Grantley, Roxborough, McLean's No. 5, Echo, Elm St., Golden Tips No. 1, Apple Hill Pride, Avonmore, McLean's No. 4, McLean's No. 2, Duff's Corners, St. Elmo, Farmer's Joy, Goldfield No. 5, Bloomington, Clover Side, Golden Tips No. 2, Maple Hurst, Brookdale, Sunrise No. 2, Dominionville, Guell's Farmer's Joy, North Valley, Canadian Produce, Finch, Boundary, Goldfield, Strathmore, Sunlight, Sunrise No. 3, Sunrise No. 1, Dixon's, Golden Tips, Newington, McMillan's Corners.

Factories in W. G. Gardiner's Group.

Limebank, Keystone, Fallowfield, Oxford Mills, North Rideau, Bishop's Mills, Kemptville, Belmeade, Malakoff, Olive Dale, South Gower, E. and W. No. 17, Merivale, Jockvale, E. and W. No. 1, Green Valley, Farmer's Union, Inkerman, Gray's Model, Gordon Model, Scott's, Maple Grove No. 1, Advance, Frame's No. 2, Richmond, Manotick, Kemptville No. 2, North Gower, Patterson's Corners, Mountain, Hallville, Reid's Mills, Carsonby, Miller Corners, Richmond, Kidd's No. 2, Goodwood, Evertt's No. 1, Frame's No. 1, Burritt's Rapids, Oxford Station, Suffell, White Globe No. 3, Rockdale No. 1, Taylor's Daisy, Taylor's, Minto.

Factories in W. G. Graham's Group.

Cedar Grove, Kirk Hill No. 3, Minto No. 4, Lochinvar, Spring Grove No. 3, Burtalbin, Farmers' Fancy No. 1, C. P. R., Spring Grove No. 2, Ash Grove No. 2, Spring Grove No. 6, Kirk Hill, Maple Row, Beaver Creek, Minto No. 5, Maple Leaf No. 39, Spring Creek No. 1, Burtalbin No. 4, Fournier, Beaver Cricket, Maple Leaf, Spring Grove, Home Factory No. 6, Kirk Hill No. 4, Glen Andrew, Spring Grove No. 4, Ash Grove No. 1, Aberdeen, Aberdeen No. 1, Glensanfield, Stardale, G. T. No. 1, Green, Spring Grove No. 1, Kirk Hill No. 1, Canadian Beaver, Minto No. 3, Ash Grove No. 3, Bush Grove No. 1, Minto No. 4, Farmers' Fancy No. 2, Spring Grove No. 7, Laggan No. 1, Riverview, Spring Grove No. 5, Kirk Hill No. 2

Factories in A. H. Wilson's Group.

Union Valley, Leeds Union, Miller's No. 2, Farmers' Choice, Maple Grange, Minto, River View, Miller's No. 1, Shanley, South Branch, New Model, Charleyville, Meech, Stanley, Barlow's, Roebuck, Oak Leaf, Willow, Farmersville, Grenville, Hyndman, Park Street, Glen Mail, Lilly Springs, Fairfield, Star, Palace, Algonquin, Garreton, Maitland Union, Glen Buell, Cedar Grove, Groveton, Mainsville, Pittston, Glenmore, Glen Moore, North Star, Glen Elbe, Greenbush, North Augusta, Lee Hill, Royal Dominion, Domville, Langstaff No. 1, Crystal Rock, Cardinal, Ireland, Eclipse.

Factories in Mr. Dool's Group.

Starlight, Navan, Gilt Edge, Golden Globe, Millbrook No. 2, Russell Road, Blue Bell, Metcalfe, Leitrim, Kenmore, Windsor Star, Greenwood No. 1, Spring Hill No. 1, Leonard, Russell No. 14, Eastman's Springs, Edwards, North Branch, Maple Leaf A, McGregor Star, Vars, Spring Hill No. 2, Sarsfield, Century, Alpine, Banner, Osgoode Centre, Cold Springs, Hillside, Morning Star, White Star No. 1, Milbrook No. 1, Hawthorn No. 1, Alpine No. 2, North Osgoode, Greenly, Sunrise.

Mr. Ayer: How do you account for the fact that some factories showed openness and others did not when the cheese were shipped in the same car?

Mr. Publow: When cheese are open simply from being sprung by the heat it is of a different character to that which is due to the manufacture.

Mr. Ayer: Why do some cheese show openness from the same factory, and others not?

Mr. Publow: That is from different vats of cheese. When shipped at a high temperature it takes a certain time for it to take effect; in other words, some cheese are not as perfect as others.

Mr. Ayer: I want that fact brought out, because some cheese do show openness and others do not.

A Member: Would not it be a good thing if the patrons delivered their own milk at the factories?

Mr. Publow: Fifty per cent. of the patrons deliver their own milk to the factory, yet we have the greatest proportion of poor cheese come from the east of this section. That is not because the milk is not of better quality, because the great majority of cases are in fairly good condition, but it is due to the small and poorly equipped factories with incompetent men in charge, and the curse of Eastern Ontario that we have to deal with is due to the lack of ability of the men who have charge of these factories. If you will take this report and see what number of men are actually well qualified it will astonish you.

SOME POINTS REGARDING BACTERIA IN RELATION TO DAIRYING.

By Wm. Connell, M.D., Queen's University, Kingston.

For a number of years I have had an opportunity before the annual meetings of the Eastern Ontario Dairymen's Association of addressing its members on "Bacteriology in Relation to Dairying," and as the meetings are held in different localities I can use the same text again, and, only those who follow the meetings each year will recognize the text and the sermon, and frequent repetition will not injure them.

In the minds of most people, when one speaks of bacteria, germs or microbes, there is conjured up a vision of horrible creatures with legs innumerable, whose effects are destructive or even deadly. Let me say that in reality they are very simple looking objects when seen under a microscope, in fact so small, simple, and harmless looking that one seeing them is very apt to say what good or harm could such insignificant objects possibly effect? The individual germs consist of a single celled plant, microscopic in size, and indeed visible only with a powerful microscope. But by the massing together of large numbers of these cells we can get masses visible to the eye, or their presence is made manifest by various changes which they are able to effect in the material in or on which they are developing. Nearly three thousand different species of bacteria have been described, and have been found to be effective agents in the production of many processes, most of which are highly advantageous to man, or to soil or water, etc. On the other hand, they have been found to be active in many processes which we ordinarily look upon as destructive and dangerous, or at least highly undesirable. When we come to consider some of these processes in which bacteria are active, we can readily understand how it is that there are some which we look upon as highly desirable forms and others which we must place in the opposite category.

With most people, to speak of bacteria is to bring up the spectre of disease, for we now know that most of the common infectious diseases of animals and man are of bacterial origin, and even such conditions as boils and abscesses, colds and sore throats, appendicitis, and gall stones are of like origin. Now, all will agree that the disease producing or pathogenic

bacteria are highly undesirable, and that there is necessity for people to take all precautions to check their development and limit their spread in the interests of public health.

Another large group of bacteria are engaged in the processes of decomposition, decay, or putrefaction. When an animal dies its tissues, unless preserved by chemicals or by cold or by drying, begin to decay, to putrefy. This is due to the entrance and growth of bacteria which bring about marked destructive alterations in the tissues. The actual disintegration of such a body is materially assisted by bugs, beetles, and worms, yet the main destructive changes are due to bacteria. In the same manner a tree falls and gradually decays, the decay being due to bacteria and moulds assisted again by beetles and worms. It is a process in which organized material (matter of complex structure) is reduced again to simple elements which pass off into the air as gases or into the soil as dust and ashes. These simple elements—the gases, dust and ashes—are now in a position to form fresh combinations, to enter again into the structure of plants and trees, of animals and man. It is Nature's method of keeping the working material of the universe in circulation. It will be hardly necessary for me to say that the putrefaction of meat, the rotting of eggs, and certain decomposition changes in milk, butter, and cheese are due to these putrefactive bacteria, so that while it is a natural enough process it is one which is not necessarily a desirable one to man, or rather to the individual who is affected thereby.

Another process, of vast importance to agriculture, due to bacteria in great part, is the process known as nitrification, which goes on in the soil on in some waters and most manures. Into the structure of the cell constituents of plants and trees nitrogen enters so that a supply of this in available for is requisite for the nourishment and growth of plants. There is an abundance of nitrogen in the air (over 78 per cent. of the air consisting of this gas) but such nitrogen is not available for plant nourishment. Now certain soil bacteria known as nitrifying bacteria have the property of causing the inert nitrogen of the air to enter into combination with other elements forming nitrates ("nitre") which combination is now available as plant food. Without this process most soils would rapidly become sterile. Attempts are now being made, with only fair success so far, to inoculate land with cultures of these nitrifying germs. It will require much work and experimentation yet to get this important matter on a good working basis.

Another important group of bacteria are active in many processes classed in fermentations. This is in reality a peculiar type of decomposition whereby simpler bodies (chemically speaking) are produced from these of somewhat more complex structure. Among the fermentations one commonly sees in the fermentation of solutions containing sugar into alcohol, as in the making of beer and wine; the further fermentation which such alcoholic solutions may undergo in their transformation into acetic acid (vinegar) is also a well known process. Another very common process is the "raising" of bread by use of yeast. In butter, and especially in cheesemaking, the entire process is practically one of control of fermentation. Souring and curdling of milk, the ripening of cream, and acid production in cheesemaking may be instanced as common examples. Of course all the fermentations in cheesemaking are not of bacterial origin, as the curdling is due to the rennet ferment added, and the ripening of the cheese is also due mainly to the digestive ferments added in the rennet.

Considering now the bacteria in milk, let me first state that while the milk in the udder of healthy cows is free from bacteria that it is not possible by the ordinary methods of milking to secure milk that is free from these

germs. Why? Because it has been shown that many germs can and do thrive about the lower ends of the cows' teats just within the opening as well as on the surface of the teat, and these almost of necessity will be washed into the milk. Many more will come from hairs and stable dust, particles of manure and straw, from pails or milk vessels not thoroughly sterilized, and from like sources. But while by ordinary methods of milking milk cannot be secured free from bacteria, yet there is a direct relationship between the numbers of bacteria so found and the cleanliness exercised in milking. It has been shown many times that the greater the care and cleanliness exercised in securing milk the fewer bacteria there will be present, and as a rule there will be less chance of undesirable forms of bacteria being present. The difference is frequently very marked even in the same herd under different conditions of care and cleanliness, being in proportion of from 1 to 6 up to 1 to 30 between careful and slovenly methods. Now the effects which the bacteria which have been introduced will bring about will depend, first, upon the character of the germs introduced, and secondly, upon the opportunities afforded them to develop. A number of the bacteria which get into milk do not thrive well and are not able to bring about any special changes in it. These may be at once dismissed from consideration. One great group of bacteria which in the vast majority of cases will be found present is the group of acid-producing bacteria leading to souring and curdling of milk if they are allowed to develop long enough. This is a fairly large bacterial group containing a number of very well known species and others less often met with. In this acid-producing group are found the desirable species of bacteria requisite for butter and cheesemaking, but also some highly undesirable species. The desirable forms of the acid-producing group are those which produce lactic acid without by-products such as gases and other undesirable decomposition products. The great type of this species is the bacterium so prevalent in Eastern Ontario and which is known as the Lactic Acid bacillus (Esten). This bacterium when introduced into milk and allowed to develop produces a clean flavored souring without gas and the whey which separates out from curd is watery. This is the only desirable bacterium for butter and cheesemaking, and in good cheese it is found that over 99 per cent. of the bacteria present belongs to this species. This bacterium finds its normal place of development in milk, and flourishes in great abundance in milk and its products; hence it is seldom absent from dairies or factories. But there are also some bacteria which produce more or less acid and yet are undesirable. These are the bacteria which when introduced into milk, sour it; but the curd is torn with gas holes, or gives off a bad flavor and the whey which separates is somewhat milky. Or if present, and the usual fermentation test is carried out, gas formation and bad flavor become much more marked. In smaller or larger numbers these bacteria are found in the milk brought to most factories. They come particularly from manure and stable dust, but they readily habituate themselves to milk and are the most important causes of trouble therein. With some species, to a certain extent, the acidity developed by their growth checks their deleterious action; but with some other forms their undesirable features continue to be marked even with the development of considerable acidity. When these bacteria gain the upper hand in cheesemaking we always have an inferior article more or less tainted, varying from a "not clean" flavor through the various grades of "off" flavor to a distinct rank rancid article. Some of these bacteria may kill out the desirable acid formed about a factory, and its tributary dairies, and may lead to very serious results not readily eradicable. Such cases require at the factory a supply of "starter" of the desirable acid-producing type, thorough cleansing of all factory vats and

whey tanks, and at the farms require extra care in washing and scalding of cans and pails, extra care in milking, and also thorough cooling of the milk. For bacteria require for growth only a suitable food material like milk, but the temperature conditions must be favorable. By cooling the milk, bacterial development is largely checked, and if low enough entirely prevented, so that cooling of milk ranks equal with cleanliness of milking in the production of a first-class article of milk at the factory doors. Milk in the summer season should be cooled to 65 F. at least, as rapidly as possible after milking.

But besides the acid-producing bacteria, other forms occasionally gain entry to milk. Of these the slime producing or sweet curdling bacteria are seen not uncommonly. These bacteria either make the milk slimy and stringy or else curdle it without its becoming sour. This condition may be met with either in summer or winter and may be brought by several different bacterial forms. Some of these act by producing a ferment like rennet, while others act by their having about them a glue-like covering, and by these coverings sticking together, the milk rapidly becomes filled with a stringy mass. I had a number of examples of this kind of milk sent me for examination last summer. One was particularly interesting as it was in the milk of a large dairyman supplying milk in Kingston. This man's milk for several weeks was quite stringy when allowed to stand over night at a temporature of 70 degrees F. or over. He was a careful man and took very good care of his milk, and made an extra effort to get rid of the trouble, but at first without much sucess. Later, on examining the milk of each cow separately, it was found that one cow's milk almost invariably became slimy on standing. No special cause could be assigned for this as udder was healthy and the other conditions the same as for rest of herd. It was evident that the germ had habituated itself to grow in the lower ends of teats of this cow and on rejection of her milk the condition cleared up. This is not the usual source of this trouble, however, as it is more apt to come from bacteria found in hay dust and from the scum of stagnant, grassy pools;—the former blowing into milk cans and pails, the latter dropping when dried from udders, sides and tails of cows during milking

Other types of germ infection of milk are at times met with, but I will not dicuss them here. I may mention such as yeast infection and rust spots.

During the past year I have again had opportunities to see most of the usual types of "taint" or "defect" in cheese, and in a number of instances have had the opportunity, along with Mr. Publow, of making a personal investigation of the local conditions.

One factory visited by us had marked "rusty spot" cheese. To the casual observer the factory and utensils were clean, but on careful examination of strainer racks, mill, floors, and gutters a different tale was told. On the floors (cement) and gutters particularly, little rusty points were not difficult to detect, and these points were largely made up of the rusty spot bacillus. In this factory, too, there had been some yeasty open cheese, and a yeast corresponding to usual type of yeast met with in this condition was isolated from strainer rack, gutter and whey tank, so that the one investigation disclosed the fact that this factory was quite capable of seeding itself, and also, through the whey, of infecting all milk put into cans which were not thoroughly cleaned. While on this point I may say that the ordinary cleaning given milk cans never frees them from bacteria and yeasts, and if these are present in the whey they will come back in the milk in at least two-thirds of the cans, and very frequently will return some five, some twenty, and some a hundred fold.

At another factory the cheese were decidedly "off flavor," or as Mr. Publow more emphatically termed it, were "Stinkers." Here, on applying the fermentation test to a number of samples of patrons' milk, it was very evident that several were seeding the factory with a choice lot of the usual type of bacteria found in such conditions (*B. lactis aerogenes*). But there were conditions about this factory itself which were not of the best. Thus the water used for cleansing purposes came from a nearby creek. From this a short way up cattle drank and the shores were swampy. This water at the time of our visit smelt of the cow stable, and showed many floating vegetable and animal particles. Bacteriological examination showed the presence of bacteria characteristic of manure in this water, including numerous bacteria of forms mentioned above, as well as an abundance of these bacteria found in water with much vegetable organic matter. This water was certainly not fit for use even after boiling.

Too many of our factories have a poor water supply. I know that two-thirds of the factory water sent me for examination is unfit for use, that is, contains bacteria which are directly harmful to butter or cheese, or indeed which which make the water as dirty as the substance supposed to be cleaned by it. Of course, it is probable that only the suspicious samples are sent me, and that those not under suspicion would no doubt be better. Granting this, yet from my experience in the examination of well waters from both rural districts and towns, it is almost certain that one-third of them would not pass a proper sanitary inspection and examination. Of course the matter of factory water supply is very intimately bound up with that of factory drainage, for it is from the waste matter about factories that the wells are most frequently infected. To the credit of our factories be it said that drainage conditions are rapidly improving, and no doubt in a few years all recollection will disappear of the fact that a cheese factory was as soon appreciable to the nose as to the eye. The questions of water supply at farms and factories, and of factory drainage, are ones the importance of which I cannot too strongly urge upon our sanitary inspectors, factory owners, and patrons.

Just let me in closing shortly summarize some points in connection with bacteria in dairying.

1st. Bacteria are invariably present in milk and the development of certain species therein is necessary for the production of essential or desirable fermentations in butter and cheesemaking, consisting in the former (butter) of the ripening process and in the latter (cheese) to acid development.

2nd. Bacteria of desirable character are widespread and are almost certain to be present under normal, natural conditions.

3rd. It is essential that bacteria of undesirable character, *i.e.*, those capable of inciting taints or defects in milk or its products, should be excluded.

4th. Bacteria of undesirable character are nearly always derived from sources the reverse of cleanly—from manure and manurial dust, from bad water, from improperly cleansed pails and cans, etc.; hence to avoid these it is essential that *care and cleanliness* be exercised in milking, handling, and storing milk.

5th. For bacterial development to occur, besides suitable food, the temperature conditions must be favorable, and practically we find that for most bacteria developing in milk, the temperature becomes more favorable the more nearly it approaches the temperature of our bodies, 98 to 100 degrees F.; hence to prevent such bacterial development it is essential during the warmer months to cool milk below the point of rapid development, *i.e.*, down to or below 65 degrees F.

6th. While such temperatures also prevent the rapid development of the normal acid-forming bacteria, yet it interferes with these less than with most of the undesirable bacteria in the period during which milk is usually kept for cheese factory use.

7th. It is as possible to infect milk during manufacture with undesirable forms of bacteria as it is at the farm; hence it is as essential that care be taken in handling the milk at the factory, and that everything which comes in contact with the same during manufacture be as clean as possible.

REVIEWING THE DAIRY SITUATION.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

I fear that what I have to say in leading the discussion on previous papers has been diverted into other channels by Dr. Connell's most valuable paper on Bacteriology. I am, however, very glad indeed to take part in this discussion this morning, and particularly glad to do so in the town of Picton. There are some special reasons why I have pleasure in meeting dairymen in this district. I do not know any other part of Canada where the suggestions I have made in connection with my work have been so well received and adopted as they have in this part of the country, and I am glad to find you are still of the same mind. Mr. Publow referred to the fact that nearly half the cool-curing rooms in eastern Ontario were located in this county. I do not think you are making any mistake in that connection. I have had opportunities of studying the importance of the cool-curing of cheese, not excelled by any other man, and the more I know of it, the more convinced I feel that it is only a question of time until every factory in this country must be equipped in this way.

I listened with very much pleasure, and I am sure you all did, to the remarks made by Mr. Barr; and I think you will all agree with me when I say that I feel like congratulating myself that I have such a very capable assistant in carrying on my work.

Mr. Barr has been referred to as the official referee. That is not Mr. Barr's permanent work. He is capable and able to serve the country in much more important ways; not but that the work of an official referee is important, but I think a man qualified to do that can be found, and Mr. Barr can do other work which will be of much greater importance.

Mr. Barr covered his ground so well that it does not need discussion. He states it is the duty of the salesman to acquaint himself with certain conditions in Montreal. I would like to emphasize that point. We heard a great deal about the trouble in selling cheese in some districts. I believe one of the things that gives rise to the trouble is because there are too many men managing factories and selling cheese, who know absolutely nothing about the business. There is no other business under the sun that could be prosperous under such conditions. I want to say that I have watched this thing a great deal, and I think it is something that should be remedied. We must put some business methods into the handling of our cheese, and if we did the difficulty would disappear. Advantage is taken of the man who is ignorant of his end of the business, and that is where a great deal of the trouble arises. I think I can go further than that, and say that if I was a milk producer I would feel inclined to insist that the man who manages the factory where my milk went would make it his business to study some of the things which he would handle in conducting the business.

I do not mean to include all salesmen under that head, because I know there are many successful men who are not having any difficulty. I would like, also, to support Mr. Barr's suggestions about the marking of cheese and boxes. We sent out circulars from my office in Ottawa to as many factories as we had the addresses of. The factories in western Ontario have been doing that as long as I can remember, and I have been connected with the cheese industry up there for nearly thirty-five years. They do not mark the boxes because the cheese are inspected in the factory.

I am sure I need not pass any compliment to Mr. Publow, who is so well known to the dairymen of eastern Ontario, and very much farther afield than that. Mr. Publow is always a welcome speaker at any of these gatherings, and always gives us something of value. I was glad to hear him dwell on the importance of this matter of sanitation, and he told us that there is great improvement in that connection throughout the district over which he has supervision. There is a great awakening all over the civilized countries in connection with matters of this kind. The work which men like Dr. Connell have been doing the last few years has had a great deal to do with bringing about improvement in this connection and arousing the people to the importance of more care and greater attention to sanitary conditions surrounding the preparation of food products. We must handle these things as quietly as possible.

Mr. Publow referred to the question of making whey butter. I have had a great deal of correspondence with factorymen from the Province of Quebec with regard to this matter, and my advice has been to go slow until they known more about it. Making whey butter is not new. One of the first things I can remember in connection with cheesemaking was the making of whey butter, but we only skimmed the cream off the fat and used the butter to grease the top of the cheese. Whey butter was made in many of the factories fifteen or sixteen years ago, and for some reason or other the whole thing was dropped, and it never made any very great progress. I mention this because I think there has been a wrong impression in the minds of many that it was some new discovery in the dairy business. It was practised in Ontario, even up at Deseronto, fifteen years ago.

Some slight reference was made to the question of shipping green cheese. I think most of you know that I took a pretty strong stand on that point last spring. The Picton cheese buyers were among the first to take up the question, and they passed a resolution in favor of holding cheese in the factory a reasonable length of time. (Applause.) I had occasion last summer to look into that question while in England, and I had a great many object lessons. If these cheese are put before the consumer before they are fit to eat it will have a bad effect on the consumption of Canadian cheese. And I hope the dairymen will give the matter full consideration.

While in England last summer I had an opportunity of visiting the home of Cheddar cheese in the County of Somerset. The name of Cheddar originated in that county. I got a man who was thoroughly acquainted with the county, and engaged an automobile, and we covered nearly 200 miles in one day, and we visited the Dairy Show in Shipton Mallet. There were over 1,000 cheese on exhibition, and I visited the dairy where the proprietor always gets 18 cents a pound for his cheese. They were just Cheddar cheese, the same type that you make here. They are made on what is known as the quick ripening method. That does not imply as much as it would here because these cheese are all left in the curing-room ten weeks before shipping. This man believes the proper temperature for curing is 60 degrees, and I found that universal throughout the county of Somerset.

There is just one point in connection with the production of milk which I think is worthy of note, and I think it bears out what Dr. Connell has told you. In Somerset the cows are all milked in the pasture field. In other parts of Great Britain they milk in the stables, and in Scotland they milk in the stables, but in the County of Somerset they milk in the pasture. They do not have any set milking places; they are milked here and there about the pasture so that there is no collection of dust and filth. There is less danger of contamination. They do that purposely to prevent the collection of dust. Sometimes where the cows are milked in the same place all the time it is a great source of infection to the milk. Another point I would like to make is, that we naturally like to know the difference between cheese that would bring 18 cents a pound and the average character of Canadian cheese. As near as I could make out it is something like this. These cheese are well made, very rich and meaty, the great value of this cheese lies in the flavor. I think we make a mistake in this country, and that we set up a rather wrong standard with regard to the question of the flavor of cheese. It is probably due to the fact that most of our cheese go out before they develop the characteristic cheesy flavor. We are satisfied with our cheese if they have the absence of bad flavor. I want to point out to you that cheese having no more positive quality than that would not bring 18 cents a pound in Somerset. In addition to that absence of undesirable flavor, the cheese must have the real positive cheesy flavor, and the higher that is developed the more the cheese is worth and that difference will make people over there pay 6 cents a pound extra for it. We cannot have this high cheesy flavor, this rich nutty flavor, in cheese if we cure our cheese at a temperature of 80 or 90 degrees, and allow them to be exposed at a high temperature. Cheese must be kept uniform at a temperature of 60 or 65 degrees; I think 60 degrees is the very much safer temperature. These cheese that I speak of are never allowed to get warm. Some reference was made by Dr. Connell to the cooling of milk. All I have to say on that point is that I have recently published a bulletin as to the use of ice on the farm, giving ample directions as to the putting up of ice with some plans of making combined ice house and milk stand. I believe the first one of these was built in this county.

I want to make one reference to the shipping of cheese from this district. Last year it was brought to my attention that there was a possibility of having ice cars on the Central Ontario Railway, and we are quite willing to make necessary arrangements with the railway to supply these cars, and to pay $5 per car for icing for a limited number of cars per week. The cars are supplied by the railway company on the demand of the shipper. We have nothing to do with the supplying of cars. There seems to be some difficulty in making satisfactory arrangements for shipping cheese from Picton by railway. I have been approached to make some similar arrangements on the boats. I have an appointment to meet the Cheese Board and the shipping company this afternoon, and I hope we will be able to make some similar arrangement as was made on some of the lower St. Lawrence boats. I think it would be a great thing. (Applause.)

There are difficulties in the way of this river boat refrigeration, and there is a difficulty in the running of a steamer carrying unoccupied space. It is quite a difficult thing to provide cars which are not run unless there is something for them to carry. The steamer must go, and it is hardly fair that we would have space entirely vacant. I hope we will be able to make some satisfactory arrangement. I realize that the cheese whether cool-cured or not, should be carried at as low a temperature as possible—at least 60 degrees. I do not agree with the statement that a ventilated space on a

river boat is as good as an iced car, because the temperature is not low enough; ventilation will not produce a temperature below the outside air, and the outside air on the St. Lawrence is very often 85 degrees. A box car closed up will, of course, become hotter than the outside air, and a refrigerator car without ice will be hotter than an ordinary box car. We want the temperature down to 60 degrees, and I believe the time will come when no person will think of shipping cheese unless they have some provision of that kind. (Applause.)

The Government does not undertake to supply all the cars that are required. I think it amounts to 120 or 150 cars a week over the different lines. It is a question of first come first served, and the wide-awake shippers are getting rather more cars than the others, because, they take hold of the question and place their cars and get them. I want to make it clear that the Department has nothing to do at all with the supplying of the cars. We simply induce the railway companies to put on these cars by paying $5 for the icing. If it costs more than that somebody else has to pay. The service begins usually about the first of July.

Mr. JOHN MCGREGOR: I think the first of July is a little late. The weakest cheese we have in the season is made from the first grass. I think if you change the date from the first of July to about the 15th of June you would be doing the country a good service.

SENATOR DERBYSHIRE: Never mind the date; give us cars when the weather is hot.

Mr. RUDDICK: We have to make definite arrangements with the railway companies, and we cannot tell whether the weather is going to be hot next week or the following week; it is a question of doing as much as we possibly can. We find that by taking this service ten weeks, we are doing the greatest good to the greatest number of people. You are more likely to require iced cars during July and August and the first part of September than you are in the month of June. If I were shipping cheese, I would have an iced car if I had to pay the $5 out of my own pocket. You have to order ice cars a day or two ahead. They can only be iced at certain places, and refrigerator cars are limited in number.

The object of the Government in providing these cars was not to save somebody $5 on a car; it was simply to educate the dairymen of this country to the importance of shipping cheese in iced cars. You did not hear anything about shipping cheese in iced cars ten years ago, but now, through this object lesson, you have begun to discuss these matters. I am very glad to see that you criticize and ask for these things, for it shows that you are taking an interest and realizing the importance of this question.

HOW TO INCREASE OUR OUTPUT OF MILK.

By J. H. GRISDALE, AGRICULTURIST, EXPERIMENTAL FARM, OTTAWA.

I have attended many of the conventions of both the Eastern and Western Dairyman's Associations in Ontario, and I must confess that I see before me to-day by far the largest representative audience I have ever addressed. I must congratulate you farmers of Prince Edward upon the interest you are taking in dairy matters, and the good way in which you exemplify your interest by coming out to learn a great deal that may be of use to you. The importance of the dairy industry in this country grows daily: the output

is increased year by year, and the quality has improved. The quality has improved, I have no doubt, largely on account of the efforts of this and similar associations to make improvement by indicating to the inspectors and makers what is required, and by inspiring them with renewed efforts to carry on their work better, so as to produce an article which will command a higher price than has been paid heretofore.

The farmers of this country, have another side of this question to consider, and that is, the increasing of the output. That is a question that sometimes frightens us a little bit. I have heard it said that if we materially increase the output, the price will be lowered, and the prices will not be so good. I believe that is not the case. If we can increase the output, and if these cheesemakers, inspectors, and buyers do their duty, we can command just as high a price if our make were doubled.

The question I want to take up with you to-day is to consider what steps we can take and what plans we should follow as farmers in this Province, to increase our output of milk, as you know on this rather materially depends the cheese output. We might be considered a milk producing rather than a grain growing country; still there are some who have not found it convenient or possible or advisable to change, and those who have changed are still retaining many relics of grain growing.

When producing rough fodder was the general business of the farmer, feeding profitably was a matter of very minor consideration. As an example of the relics of growing cheap fodder let me cite the great number of fields which we have on our farms. In olden days we thought it was a great advantage to have a number of fields; in fact, when we were cleaning up our farms we managed to get 10 acres or so cleared, and we would fence up that much, and when we rounded up with 100 acre farm cleared, we found ourselves with anywhere from 10 to 20 fields, of varying size and varying conditions. Now many of us have changed this, and we should have fewer fields. We attempted to grow certain crops at irregular intervals in certain fields, or in a certain area of the farm, because we are apt to think they are in a nice position, well located, and convenient for hauling out manure, etc.

Another point. As farmers we are apt to neglect our cows. We are apt to think, "Well, they are only cows, and we have got to get this harvesting done, and these roots off, and this plowing done, and we will look after the cows the best way we can." That is a relic of the old times. If the cows come at night to be milked they would be milked, and if they didn't they would be milked in the morning.

In many parts of the Province there are remnants of that old doctrine of taking the cows when you can get them; work away till nine o'clock, and then rush in and milk the cows. If we would succeed as a dairying country we must get rid of these old relics. What steps shall we take to get rid of it, or how are we going to succeed to make ourselves into a first-class dairy farming country?

In the first place we must consider the cattle, and their care, and secondly, the way to provide for these cattle, independent of comfortable quarters in winter and summer. Take conditions in the summer: First, we must have ample food, and you may get that in various ways. You may have a large area of rough pasture or poor pasture and expect your cows to wander around all day looking for feed, with the temperature, it may be, around 90° or 100°, or storms raging, still you expect them to get around and hunt for that feed. That is not the best way. We should arrange to provide food for the cattle in ample quantities and conveniently, and be able to give it to the cattle so that they will be able to consume it in comfort; and that means better pasture, better arranged farms, ample provision for supplementing this pasture

if and by any accident the pasture seems to fall short. We must have good fodder. If we give them nothing but clover in the middle of June, we will find that they will fall off a little. We must make arrangements to have properly balanced rations right through the season. We must not expect them to do well if we compel them to roam through the fields in the hot sun.

In the winter, we must have, in the first place, something appetizing—something that will tempt the cattle to consume large quantities of food. The aim of every feeder should be to compel his cattle to eat a large quantity of food, not the most expensive feeds, but foods of the right kind. It must be satisfying. It is not enough to give them wheat straw, and expect them to thrive on that; we must give them something of high feed value, not necessarily oil meal or gluten, or cotton seed meal, but something in addition to the filler. The primary consideration must be economy of production—the cheapness of the food. If we are going to lower the cost of production, we must produce feeds that will be produced at the lowest price, and these feeds must be wholesome. Most of the feeds, I am happy to say, are of that kind. I am not talking of winter dairying on the present occasion, but rather of the dairying as carried on by the average farmer of this country; and to have this done as nearly ideal as possible something must be done in the arrangement of the work on the farm in the system of farm cropping, and farm cultivation.

In farming more than in any other industry it is essential that system prevails. If a farmer operates his farm without a definite plan as to how the operations are going to be carried on, he will not make that success that he should; he will not reap the rich reward which would have been his had he with the same energy and same ability put things under a systematic arrangement and carried on the work in an efficient and profitable manner.

Very recently I had this important point strongly exemplified. We are, more or less, at the mercy of climatic and soil conditions, but we can very largely control these if we are willing to adopt a system and stay with it, and this system is what I want to talk about to-day. Of course, the man who has some rough land must naturally leave that part of his farm to pasture. Those of you who have considerable rough land will find it will be valuable for your young stock and dry cows, but that part of the farm that is arable should be considered as a whole, and then divided into parts, upon which part should be followed some regular system of rotation.

In the first place, the arable portion of the farm should be divided into two parts, which might be set aside, one for winter and pasturing, and the other for summer feeding. From my observations I think that each farmer having 100 acres should set aside from 12 to 15 acres upon which to grow what might be known as soiling crops for the feed of his cattle during the summer provided he requires it, and has not sufficient pasture. If he does not happen to require it in any given year, the crops are there for consumption in the fall or winter or early in the spring. This area of 12 or 15 acres should be divided into three equal fields. Supposing we have 15 acres, that would give us three 5 acre fields. These fields should be carefully selected, in my opinion, and I am speaking according to experiments I have conducted. They should be selected adjacent to the buildings or as convenient to the buildings as it is possible to get them, and upon these fields should be grown three different crops. First, clover upon one 5 acre field, then peas and oats upon another 5 acre field, and corn upon the third. This corn should be part of an early maturing variety and part of a later maturing variety. The clover, of course, will be all ready about the same time, but we can start to cut it early and continue cutting till late. Peas and oats, or whatever grain you select should be sown at different intervals, ten days or two weeks

apart. Sow a half acre or two acres as the case may be. The next year, on the field where clover was grown, I would sow corn. Manure the clover during the winter, plow down in the spring, and sow corn of the same variety as the year before. Where the peas and oats and vetches are sown, there should have been clover sown with them. Upon each field we follow a three year rotation, so that in three years we have first, clover; second, corn; third, peas and oats or oats and vetches, or something similar; fourth, clover, fifth, corn; and the sixth peas and oats and vetches and so on *ad infinitum*. It will require comparatively little manure, and you may anticipate continual and rapid improvement in the soil. The only danger I have experienced is that sometimes the crops of oats and vetches are too heavy, and it is hard to get them cut in time to prevent them smothering the clover. All this could be done if they are sown at proper intervals. To sow the whole thing at once, and then to get it off as best you can, is to insure failure, but to sow at intervals is to ensure success.

These three fields of 5 acres each being picked out, we should have in addition, some small areas for pasture, where we can feed this stuff to some cows or calves.

The balance of the farm should be divided into four equal fields, and on them you should follow a four year rotation.

Now, you will say, my farm contains five or ten fields, and I am not going to take out the fences and ditches and level things up. That is not necessary. You should merely arrange your fields in whole or in part, and have the same rotation in one or more fields. It is not necessary that a quarter of the area be in one field; it might contain two or three fields; but follow the four year rotation.

In this four year rotation you would have one field for pasture, one field for hay, one field for grain, and one field for corn, roots and potatoes, and if you do not think you want to sow such a large area as 20 acres for corn potatoes and roots, you might have a little bit of mixed crop to be cut for hay or feeding off. This rotation would give you 20 acres for pasture, and in addition you would have 50 acres whereon you would get green feed which should, I consider, carry you safely through from May to October, when the feed from the rest of the farm would have to come in. On this 80 acre division, or on the four year rotation, you would have a succession of crops. The first year hay or grain; seed down with timothy or clover, pasture in part or whole, if necessary, and if you find that you can spare part of that pasture then you will have some timothy hay; fourth year, corn. This corn land should be plowed in the spring just immediately before sowing the corn. Having been manured during the winter, spread the manure on it as hauled out, and let grass grow up with it until a very few days before the corn is sown. In this way you would have two years of clover, or practically three years, for not unfrequently clover lasts during the third year, or there is enough seed scattered from the first crop to insure some growing up the next year in the pasture. The first year you would have in the rotation three years' clover and one year fallow land with manure. During practically every year something is done to improve that soil. You have in the first year the clover and timothy sown, and our experiments carried out during some ten or fifteen years have shown us that the growth of clover during the first year from ten pounds of seed per acre, is equal to ten tons of barnyard manure applied green, and goes to show that during the first year you have improved that soil by ten tons of barnyard manure.

The second year you have a crop of clover; in fact if the climatic conditions are favorable, you will have two crops. I do not know what conditions exist here, but with us at Ottawa we practically always have two crops of

clover, and we always harvest it; we never have to leave it on the ground. If we do not cut it, we pasture it off. But, we find there is a very considerable loss when it is pastured off, unless we put the cattle on early, and then there is a loss in spite of all we can do.

The third year is timothy. There is more or less clover growing, but there is considerable timothy, and after we cut the hay off, and after we pasture it, the loss is very small indeed; in fact, although we take considerable plant food out of the soil by the crops being pastured, the soil improves a great deal.

The fourth year it is corn, and of course you know that after a crop of corn has been properly manured, the land is in better condition than it was before. Now you see what advantage you have. It is very easy to carry out this plan and the results are very remarkable.

A MEMBER: Why do you approve of plowing sod in the spring?

Mr. GRISDALE: Because we get an extra growth of green material to turn under, and when it is plowed in the spring we have a large amount of vegetable matter there in addition to the manure to turn down. This immediately begins to ferment, and a lot of this bacteria gets to work in there and warms things up, so that your soil is warmed not only above, but from below. In addition to this, bacteria liberate immense quantities of plant food, and put it into a form in which it is suitable for the plant to grow. Corn is a greedy feeder, and if you will give it lots of warmth and plant food, then you have ideal conditions to make it grow.

I have no objection to fall plowing, provided you have the manure turned in not too deep. For certain crops we want to get a certain amount of roughage; we want to get all the stems and leaves that we can, and to do that we must sow our seed on fields that are rich in humus, rich in nitrates, and rich in the elements which go to make rapid growth. Therefore, we put corn on a field where sod has been plowed down, where there is lots of decayed vegetable matter, lots of food suitable for making the stems and leaves and roots grow. Clover grows best on a field where summer fallowing has been carried on to a certain extent, and where the weeds have been fairly well eradicated. Putting two years to grain together militates against returns, and we have more advantage in cutting the crop.

If instead of sowing corn on the sod we had put grain the results would have been quite different, unless we have followed the plan of plowing in the fall, working up thoroughly and sowing grain next year. Last year we plowed a piece of sod land after August and ridged up in the fall. In the same field we plowed another piece late in the fall, worked it down in the spring and sowed oats uniformly over the whole area, and from that part that had been plowed in the early fall, we cut almost double the crop of oats, and certainly twice as good a cut of clover as we had from the field plowed late in the fall, showing the difficulty that exists in getting a good crop on late plowed land.

Rotation of crops are absolutely necessary, if good crops are to be looked for. I have seen this rotation in operation on one little farm for five years. It has about 80 acres of arable land; it had been an abandoned farm and was sold at a sheriff's sale. The young man bought it for a trifle, and he was able to winter with the material grown on that farm twelve head of cattle and two horses, and last year he wintered thirty head and didn't have to buy any feed, and he also kept four horses. He did that by following this rotation. If we are going to get the best results we must think of the comparative results. I visited a large number of farms in the London district where comparatively no labor is used at all. These farms have been practically abandoned. The young men went west; why, I could never

imagine, because there are certainly no better farms out-of-doors. The fathers left the farms and went to the villages, and the farms are rented to people who buy stockers in the spring, and let them have the grass during the summer. I enquired of some of these men, and they told me they pay a rent of $2.50 per acre. In some years they made a little money, and other years they drop money.

I visited another farm where they grew nothing but grain and sold it, and they have made a revenue of from $700 to $900, depending on the season and the prices. The revenue didn't average more than $800 a year. The farmer employed one man all the time, and one man part of the time.

I visited another farm where they kept very few cattle in summer and fed off all that grew on the farm in the winter, and on that 100 acres of land the revenue was about $1,500. He kept two men in the summer and one man in the winter.

On another farm where they kept pure-bred cattle and a few horses, and three men in the winter and summer, the revenue was something like $2,200 to $2,400. On another farm of 100 acres where they kept pure cattle, the revenue from the cattle they could keep on their places and some swine was somewhere around $4,000; one year it was $4,500. That is where they kept three men the year round.

Now, you will see the greater the amount of labor put on the farm, and the better cultivation given to it, the infinitely greater was the return. I have to go to the United States to give another instance, and I find there an example vouched for by a man upon whom I can depend, a representative of the Federal Government. A farmer near Philadelphia took a little farm of 15 acres. Upon that farm he was enabled to grow the first year enough to winter two head of cattle and a horse, and in a number of years he was able to winter thirty head of cattle and two horses, and had hay to sell. He employed a man and a boy. If you figure that up, it comes to about 20 men on 100 acres of land. We Canadians to-day produce somewhere in the neighborhood of $100,000,000 worth of dairy products, and we ought to be producing $200,000,000 and have no difficulty about it. We can get there if we are only willing to combine our energies. (Applause.)

The CHAIRMAN: I am sure we all feel highly honored that we have with us this afternoon Prof. Pearsons, of Cornell University, one of the finest Universities in the United States, who is to address us.

Mr. J. A. RUDDICK: Before Prof. Pearsons speaks I would like to say one word. Since this Association was organized we have had many men representing the dairy industry from the United States to address us. I can remember back in the eighties William Arnold, Mr. Harris, ex-Gov. Hoard, John Gould, Mr. Lewis, and many others, and speakers from this side have occasionally gone to the other side. We have learned a great deal and are very much indebted to our friends from the other side of the line. I am glad that we have with us one who was Chief of the Dairy Division at Washington, and General Manager of the Walker Gordon Laboratory, and who is now the Professor of Dairying at Ithaca. For some years past the Minister of Agriculture has authorized me to arrange for one speaker for this meeting from the other side of the line, and it was a great pleasure for me to bring to you my old friend, Prof. Pearsons, whom I have known so many years.

DAIRY EDUCATION.

By Prof. R. A. Pearsons, Cornell University, Ithaca, N.Y.

I wish to thank you heartily for such a cordial welcome. I have a friend who lives on a farm in the State of Missouri, and he claims that his farm is the best farm in the world; he says, "Why should not it be so, it is the best farm in his township, and his township is the best in the county, and old Pike County is the best county in Missouri, and Missouri is the finest State in the United States, and of course, the United States is the finest country in the world. (Laughter.)

Now, by a different line of reasoning, and a better one, and one which is convincing, I really feel to-day that I stand in the best, or one of the very best, cheesemaking districts in the world. (Applause.) I have had occasion to learn something of what you have been doing here. I have known of this place for a long time, but more especially in the last five or six weeks I have been hearing more and more about the way in which you have elevated the dairy industry to very near the top notch. I have heard this from a friend of yours whom I am glad to say is now associated with myself, and who is to-day at Cornell University, teaching a class of about a hundred young men how to make cheese. I refer to your friend, Dr. C. A. Publow. (Applause.)

When I was about to leave Ithaca, and shaking hands with him, I knew he felt as though he wanted to come with me, for he told me he hadn't missed a meeting of this Association for a number of years. Unfortunately, the work could not be arranged so that he could be absent. He wrote out this message, "To the members of the Eastern Dairymen's Association. Please accept my very best wishes that you may have at this time the greatest and most profitable convention you have ever held. C. A. Publow." (Applause.)

I shall be very glad to take back to the Doctor any messages you wish to send, and I will carry them postage and duty free, unless you put too much sugar in them. (Laughter.)

I do not believe in flattery, but persons who have accomplished what you have accomplished have a right to know about it, and to know what people on the outside think about it. I want to congratulate you upon your accomplishments. I might mention several things upon which you can be congratulated, but especially I want to congratulate you upon the high character of those who are occupying public positions and devoting themselves to the up-lifting of the dairy industry in this great Dominion.

A dozen years ago it was my privilege to come over here and make the acquaintance of Prof. Robertson and Mr. Ruddick. Since then I have been on this side of the line often, but have never come here without feeling that you have honest able men, and that these men are anxious to go out of their way to make any sacrifice for the benefit of this most important line of agricultural work. I tell you it is an inspiration to me, and to many others on our side of the line to come in contact with you people over here. (Applause.)

Why is it that so large a body of men of affairs have gathered together here this afternoon? Why is it that this county enjoys such a wide reputation for its dairying products? Why is it that you spend in four years' time $144,000 for the betterment of twenty-three cheese factories? Why is it that you people here seem so anxious to gain and maintain the leading position in the dairy progress of the world? The answer to all these questions is the same, it is "Dairy Education."

The topic which it was suggested I should speak to you upon this afternoon is "Dairy Education." It seems like carrying coals to Newcastle for me to come over here to talk to you on any phase of dairying, and yet I am glad to do the best I can. Dairy education is that training which enables one to do his dairy work in the best possible manner.

The problems of dairy education are quite similar in your country and my own, and I think it might be interesting and encouraging to you if I tell you a little about what we are trying to do in the United States in the line of dairy education. Here you have a large number of successful dairy people, so have we in the States; you have also a number of unsuccessful ones. I learned that this morning; I had never suspected it before. But you have, as we have, a large number of persons that cannot honestly be said to be either successful or unsuccessful; they are on the fence. Then too, you have, as we have, a large number of persons who want dairy education as is shown by this large and splendid audience here to-day. I never attended a dairy meeting where I felt I was speaking to a better audience than I do at this minute. (Applause.) You have also, as we have, a number of persons interested in dairy work who seem to have conscientious scruples against learning anything. (Laughter.) They are a great deal like the fourteen year old boy who would not take bitter medicine. The only way you can get anything into these people is to wait until they holler and then stick it in quick (laughter); and they always do holler sooner or later.

Then, too, in your country, as in ours, there are a large number, I am afraid, of persons who are interested in dairying, but are indifferent. They get into a little trouble and they rouse themselves enough to call on someone to come in, and that other man's brains helps them out of their trouble, and when that is over, they turn over to go to sleep again. The number of those who want dairy education in Canada, as in the United States, is increasing, and there are various reasons for this. One of the chief reasons is competition. Competition is the life of trade. There is competition between employers who seek to find the best employees. Sometimes these employers are a little slow to support their claims for efficiency by offering reasonable pay, yet they are coming to that.

Then there is the competition between those engaged in the cheesemaking business as well as those producing material for making cheese, and the best ones are the ones who are winning.

Two years ago I went to the State of Maine to visit the old home of my mother, and from Bangor I rode out in a stage coach twenty miles to the little town where she was raised. I was there a few weeks ago, and a trolley line is now operating between Bangor and that little town, and I found that the stage coach had been cast aside, and they were rapidly following the best new methods and new ideas, and very rapidly replacing the old. Why, almost everything is changed. I have heard people say that everything changes, but there are three things I believe, that don't. The way we eat does not change, the way we drink does not change, and in a few of the songs I heard this afternoon, I think the way we make love does not change. (Applause.) In the old days when transportation was poor, and most of the manufacturing products of any district were consumed in that district, it made little difference to Mr. A., cheesemaker here, whether Mr. B., cheesemaker there, was doing work better than he or not. Mr. B. could not get his cheese over to Mr. A's customer. But to-day the world is a great family. We can put cheese on the train and it will go anywhere; and if the cheesemaker here or in this district, becomes careless and lax in his methods so that the quality goes off a little, and this other man is up and knows how to

lo things, he will come over and take the first man's market right out from under his feet. (Applause.)

I am ashamed of my own country. Didn't you do it here? (Applause.) I guess you have heard of it. (Laughter.) But I tell you, my friends, we are going up. Why, that 95 per cent. of the prize money you took for cheese at Chicago (applause)—that was in 1893,—is only a scar on us now. You cannot judge us any more by that scar than you can tell the character of an Irishman by examining the bumps on his head. (Laughter.)

I tell you we have changed since 1893, and we are continuing to change. The man who knows the details and who works out his knowledge is the one who is going to succeed. (Applause.) And that means the success of our merchant princes, and our great manufacturers and our doctors and our lawyers. The man who does not know the details, and acts according to his knowledge, is the one who is going to get left in the race in life. I want to tell you something of how we are handling these things in our country. I am free to admit that we take good ideas wherever we can find them, and we have taken a good many of them right from Canada. (Applause.) We have Agricultural Colleges in every State. These Colleges are supported chiefly by the State Governments. In our own State we have a State College of Agriculture, and last year the Legislature appropriated for our use $225,000. It took a long time to get the Legislature of the State to see what the farmers are entitled to, and the farmers were asking persistently for years before any noticeable result was visible, but at last they roused themselves up and shook off their sleep, and the result was the Legislature made liberal appropriation for agricultural education in New York. Dairying is taught in most of these Agricultural Colleges, and in those States where the dairy industry is important, good professors are being provided. For example, in the State of Pennsylvania there is a building used for dairy instruction alone which cost $100,000, and at Cornell University, we have an equipment used alone for giving dairy instruction that cost $100,000, in Wisconsin the dairy building cost $80,000, in Iowa $63,000, and Missouri $40,000, while in South Carolina, away down in the land of rice and tobacco and cotton, the farmers have learned that these crops are depleting their land, and they are going into dairying in order to recover their loss, and they have a building that cost $15,000. I might name a dozen States with buildings valued at from $5,000 to $15,000 each. We teach dairying to our long course students who are with us four years, but I find the course that is attracting most attention is the short course like yours, lasting for a few weeks during the winter. Some schools continue them for twelve weeks, some of them only eight weeks, some of them four weeks, and now some special courses are given which continue only two weeks, or even only one.

One State reports that there have been 3,000 young men register in the dairy schools since it was established, about the time you were taking honors at Chicago. Another State reports 2,000 young men, and there are a number of others that have from 1,200 to 1,500. These courses are free to all; the only requirement is that one shall be sincerely in need and want of dairy instruction.

The character of our winter course of instruction has greatly changed, and I think in the next few years there will be considerable more changes. Now they put in so much time at butter making, so much time at cheese making, and milk testing.

Gradually our ability to give instruction along other lines brought about new courses that were first introduced for the long course. Marketing milking instruction is being introduced at our dairy school, and we have a special course on dairy problems. So many of our men are in special need

of a drill in arithmetic so that they can figure correctly and accurately and see the fine points in percentage and decimals.

The number of valuable subjects for instruction in dairy schools is increasing and the tendency seems to be to arrange these courses so that a man could come, and in a short time, do justice to more than a few subjects; and so arranged that a student can select a particular line of work in which he is most interested, and if he wishes to become proficient marketing milk work or milk inspection for a city position or factory inspection, or dairy inspection, or if he wishes to become proficient in the making of butter and cheese or of ice cream, or dry milk, condensed milk, milk sugar, dry casein, or milk beverages, or wishes to fit himself for a position in a dairy supply house, the probability is that before very many years he will be able to find a course adapted to his requirements.

Thus far we have not introduced all the subjects, but we are tending in that direction. In addition to our dairy schools, there are more Agricultural Colleges that give dairy instruction, so that to-day altogether in the United States there are 55 different places where one can go for dairy instruction, and we have a good many dairy Associations. There are seven Associations covering the field extending beyond the lines of a single State, and 40 State Dairy Associations. We have also experimental stations and a National Dairy Office from which they issue timely bulletins upon dairy subjects. We have a great number of dairy papers, some of which are circulated in this country.

Our Farmers' Institutes deserve to be mentioned because of the particularly useful work they are doing along dairy lines in some States. Only a short time ago I was invited to attend an Institute which was held in a barn: do you have them here? (Cries of "Yes; a few of them.") The gathering was held right in the cow stable in the presence of the cows, and the important things in barnyard management were pointed out, and no man would be willing to tell a lie right there in the face of the cow. (Laughter.) The proper way to ventilate barns was mentioned. We have tuberculosis on our side of the line, and it has spread in our section very badly, and many of our farmers have not yet learned that if they would avoid the spread of tuberculosis they must keep sanitary stables, and must provide more air and more comfortable quarters.

We have plenty of unprofitable cows on our side of the line. There are not many dairies but what have some one or two cows that are not paying for their keep. The experiments conducted at our own station to show whether or not the cows were to blame, will illustrate that point. Professor Wing went out ten miles from Ithaca and found a little herd that has been cared for the same as the average herds in that county, and he found that the herd belonged to a farmer who could be trusted to do what he said he would do, but nevertheless was shiftless. He bought these cows and said, "We would like to have you take care of these animals for the next year," and that was agreed to. The animals were left right where they had been, and every week Professor Wing or his representative went out there and took the weight of the milk, and samples for testing, and at the end of the year we knew exactly what each one of these cows had done under the management they were accustomed to. Then the whole herd was taken to the experimental station, and there they were fed and cared for as our own cows were cared for. It cost a great deal more feed for a single year, but how the milk average did increase! Some of these cows actually doubled in the amount of milk and fat that they gave, as compared with the last year, just because they got good feed. The cows were not to blame. The man who had these cows was to blame. They were kept at the experimental station another

year, and they did not make much more increase in their yield, but their physical condition improved very materially, and then we had the records for three years. One year on the farmer's place, two years on the experimental station, and each year at the experimental station was about double what it was at the farmer's home. The fourth year the cows were sent back to the farmer's home. It was not right to punish them that way. They were given the same care they had three years before, and the results at the end of the year was just about the same amount of milk, and that was the most conclusive proof that the cows are not fairly treated.

Now, I want to say a few words to the factory men of this audience. I was told there would be a good representation of factory men here, and I believe that is correct. Factory men must stand together or they will fall together. You cannot stand apart.

I want to say to you factory men that you have it in your power to do more to uplift dairying than any other force that is working. It is in your hands to do it; it is your first duty, of course, to do your own work well, and I know you will not need advice from me on that point. It is surprising what difference there is in men. Dr. Publow, down there at Cornell, divides a lot of milk up into six different vats, precisely the same milk, and six different students are put at these same vats, and at the end of the day here comes whey testing, one 12/100 and one 32/100 of 1 per cent. fat. That is the man; it is not the milk. Factory men ought to be enthusiastic about their work. Some of them do not know anything more about enthusiasm than the woman did about homiletics. She was introduced to a professor of homiletics, and finally she said, "What is homiletics? Is it a new breakfast food?" (Laughter.) The man who is enthusiastic about his work does not complain about drudgery; Dr. Bailey said at a meeting of our students that drudgery is under a man's hat. Let a man be interested in his work, and he will not think it drudgery.

The second point is that the factory man should be an aggressive but modest educator himself. He ought to be a little dairy school all by himself. Remember always that what helps the patrons helps the factories. Take tuberculosis. You have lots of data in this country on tuberculosis. We had an interesting experiment. Six cows were put into one stable. It was unsanitary, poorly ventilated and poorly lighted; and six others put into a stable that was sanitary, with good ventilation, and good light. In each case there were four that were known to be healthy, and two that were known to be diseased. These cows were kept in the two stables under all conditions alike for seventeen months, only the two diseased cows here were changed with the two diseased cows there at frequent intervals, so that the healthy cows would be equally exposed. At the end of the seventeen months all twelve cows were killed, and it was found that two of the healthy cows in the sanitary stable had taken tuberculosis and were developing the disease in a very small way, and it was found that all four of the healthy cows in the unsanitary stable had acquired the disease, and it had already come to an advanced form. And your patrons ought to know of an experiment like that. How are you going to get it to them unless you tell them about it at the factory meeting? In New York State we have about 200,000 people producing milk. If we should invite them to come into the dairy school we would have to have classes of 20,000 each winter, and keep it up for ten years, before we could take care of them all. They will not read the papers; some of them won't even look at the pictures. It takes personal contact, and the men in charge of the factories are the men who have an opportunity to exert that personal contact influence. Take the cow records. You have figures enough in your own country. Some of the

best I have seen are from these Canadian herds. Get these farmers interested in the subject; make it more profitable to them, and it will react in favor of the factory. Talk farm management, talk anything you please in the interest of better farming and better dairying, and, above all, talk sanitary milk, talk clean milk. (Applause.) Now, we used to tell the farmer arbitrarily to keep the dirt out of his milk because it will result in poor cheese or butter, but it was hard for us to give scientific explanation of it. Dr. Connell explained it to us this morning, and we have been hearing for many years about bacteria, but the farmers who have been caring for the milk do not know anything about that, and it is for you to tell them. I carry a bacterium around with me all the time. I will have to confess in advance that it is an imitation. (The speaker here took from his pocket a rubber imitation bacterium, and inflated it.) If you should get a bacterium and increase its length about 200,000 times, then you will have a little object about six inches long, and if you should increase the rest of his proportions in the same way you would get an object which at a distance would not look very different from what I am going to show you. It has no legs, no arms, no eyes; it is nothing but a little plant with just a cell wall on the outside corresponding to this rubber, and inside it is a mere jelly-like substance, and they float about in the milk even in favorable conditions. They absorb their food and expel their waste products through the cell wall, and make the milk sour and cause gas, and so on. Gentlemen of the factories, it is for you to take that message from Dr. Connell this morning, and teach the patrons something about bacteria so that they will know the reasons for it. The patron says: "What is the difference if there is a little straw gets in the milk, or a few flies; why, you can strain them out." Yes, you can, but Prof. Easton tried an experiment to see how many bacteria a fly carries. He went out in the kitchen and caught one hundred flies in a net and put all of them in a pint of sterilized water and washed them around a little bit, then he counted the number of bacteria in the water and divided them by one hundred, and found that a single fly carried 300,000 bacteria, and Mrs. Easton felt very bad to think there were such dirty flies in her kitchen. Then he went out into the barn and got 100 more, and did the same thing, and he found the flies from the barn carried 800,000 bacteria, and then Mrs. Easton felt better. Then he went to the pig pen and caught another lot of flies, and counted the number of bacteria they were carrying, and he found each fly in the pig pen averaged a million bacteria. Then he went to the swill pail and did the same thing, and each swill pail fly was found to average one million and a half bacteria. Well now, bacteria by itself are no harm; a million of them are no harm. You have got a million of them on your hands this very moment. But take a million times a million times a million and you have enough to do some harm, and it is for you to impress these facts upon the patrons so that they will see the reasons for things, and then it is easy for them to keep bacteria out of the milk.

Civilization is marked by the extent to which science is made a part of our daily lives, and that is an additional reason for spreading this gospel of dairy science until more and more men know it and act it. It will take a long time to get them all. Sometimes our feeble efforts seem a great deal like hunting birds with bear shot, but let us keep at it, always hoping, always believing that the last wayward brother will be brought into the camp of dairy science, truth, and efficiency, at least by the day of the millennium. (Applause.)

Prof. Ruddick: A gentlemen asked me a question, and I said if he would write it out I would endeavor to answer it if opportunity afforded. This

is the question: "When these Montreal men purchase a shipment of gilt edge cheese for which they agree to pay a gilt edge price, do you consider it honest and proper for the maker and salesman to allow in that lot some cheese that they know are in some way inferior, thinking that these few may pass unnoticed, and they will therefore get the premium on the whole lot without marking these so they can be brought to the notice of the buyer, and get a price they deserve?"

This is a question of dairy ethics, and I would rather some one else should answer it. I must say that the salesman or maker who deliberately puts in a lot of inferior cheese to go in the lot of good cheese without making reference to it, and hopes to get the full price, has not any right to complain if a few of his cheese are rejected, or the whole shipment is rejected. I think the two things are on a par. There is a great deal to be said on both sides of any question like this, and we have to be fair on both sides, and I do not think there is very much difference between sending a few cheese when the most of his are inferior, hoping to have them slip through, and the man who finds a few bad cheese in the lot and rejects the whole on that account.

MONTREAL CHEESE MERCHANTS TALK.

The CHAIRMAN: We have representatives here from the Montreal Produce Association. Years ago there was a spirit of antagonism between the buyers and the salesmen; now, I am glad to say that that spirit has greatly departed, and I think it is largely due to the attendance at our yearly conventions of representatives from the Merchants' Association. They come here to talk to us, and we find they are not bad looking chaps at all, and they are not inclined to do anything wrong, and probably they have their trials as well as we have. We are always glad to have them here, and to-day we have Mr. Ayer and Mr. Hodgson, we will be glad to here a short address from each of these gentlemen.

ALBERT A. AYER: I am glad to be present here to-day in this record county for cool-curing rooms in the manufacture of cheese. I think I may be permitted, at the risk of offending the Senator from Leeds County, to say that this County of Prince Edward in 1906, in the judgment of the Montreal merchants, had the record for making the finest cheese. (Applause.) In the Province where I come from, we think it is pretty good for a dairy to average $40 per cow per season, but in Leeds county there are several that run $80 per cow. (Applause.) I was in hopes that we might have a photograph of these farmers and their stables and dairies and cows, as a sort of memento of this great convention.

I have heard a good many remarks about the quality of Canadian cheese. I think I ought to know something about it, and I am quite prepared to say before this assembly and the world: *we make the finest cheese in Canada that are made in the world.* (Applause.) Now, I am stating that in its broadest sense, and backed up by the Montreal merchants who have been in business 25 years, and I have been in business a great deal longer than that. I have seen cheese from all parts of the world, and I think our opinion ought to be worth something, and I say we make the greatest quantity or the greatest proportion of the finest cheese in the world.

I do not mean to tell you for a moment that there is not a finer cheese made in England. Mr. McCargar was in England two years ago, and this very question came up about the finest cheese. There was some cheese that

cost eighty-four shillings. He said to an English friend, "I will take five cheese right across the lot, just as they come in, and I will take five cheese out of a Canadian factory, and I will put down the five Canadian cheese right beside the other, and we will judge the five cheese, not any single one." The other said, "Who shall be the judge?" and Mr. McCargar said, "You shall be the judge." The cheese were put down, and there was one of the English cheese better than any of the Canadian cheese, there were two of them that were equal to the Canadian cheese, and there were two of them very much poorer. The Canadian cheese were all alike, and the man was obliged to admit that the five Canadian cheese were better than the five English cheese. (Applause.)

It is on that principle that I say Canada makes the finest cheese in the world. It used to be said cheese are cheese. Well, now that is no longer so; quality will tell.

I have enjoyed the addresses delivered during the day. There are four houses in Montreal dealing in cheese that were in business twenty-five years ago. There is only one that has been in business forty years, and I can count up between thirty and forty failures during that time, or an average of one a year.

The basis of making good cheese and butter is in one word—*cleanliness*. I may venture to say that there are very few manufacturers of butter and cheese who cannot make a good article if you will give them good milk to make it from. There have been few improvements in the stables, few improvements in the care of the cows, few improvements in the mill, and not a great many, though there have been some, in the improvement in the feed. We know a great deal about making, and very little about how to get your milk. When the women begin to take an interest in the stable as they do in the kitchen, then we will have good milk. Women should boss that job. (Applause.)

I had a few experiments on tuberculosis on my own herd by Dr. Moore. I am a farmer, and we still have the home farm, and I am proud to say I have a son who is a farmer. (Applause.) Dr. Moore examined the herd and he found three cows that showed strong traces, and three cows that showed slight traces. He said, "I should like to kill the three cows," and he did. One showed it very badly, and two bad enough. This was in the spring of the year, and we took three others and put them in a field by themselves, and between two and three months afterwards every trace was gone. I asked the doctor what was the trouble, and he said, "The stables."

There are too many stables in the Province that are not properly attended to. We must have clean stables for clean milk and healthy cattle. I was told about a woman who married a carpenter who had thirty acres, and he was trying to keep two cows on the thirty acres. She thought she could keep four, and she gradually kept getting more until she kept thirty. What do you think of that for a woman?

I am a crank on the cool-curing rooms. I always prefer to deal with a man who has got good judgment. I say, also, use a salesman that has good judgment; if he knows all about cheese so much the better. I recommend small factories to sell only once in two weeks. You cannot compete with big factories unless you follow out that rule. Poor boxes are a great evil. I drove out to see two of your local factories; I had heard about them and I went out to see them. I saw them with my own eyes, and I know all about them, and that is what you must do. You must see things if you want to be impressed by them. And if you would see your boxes where they arrive in England, it would be a good thing.

The Montreal Produce Exchange needs your help to get a lower rate of freight, and a better class of bill of lading, and a quicker delivery and better cars and better service; and we need a legislation passed here to-day so that we can get a census of the butter made in Canada. We want the Government, or somebody, to get behind the transportation companies, and make them give us greater returns. We want to know how many cheese are coming into the city. We want to know how many cheese there are in Canada.

Mr. McGregor: I would like to know the mode of procedure whereby they get 30 cows on the farm of 30 acres?

Mr. Ayer: It was sandy land, and it was nearly all put into corn.

Mr. H. A. Hodgson: I came to Canada in 1874, and with Mr. Ayer I can say I am the son of a farmer. I came to Belleville in 1877, and I have been during that time, until 1893 right amongst the farm industries. I try to get to every convention. I was at the first convention in 1877 or 1878, when the key-note was cleanliness. There is one thing an Englishman will do, he will pay for the real article, therefore we must keep up the quality.

I have been afraid for the last few months that the business would go back on account of the farmers selling their cows, but I am glad to know it is the poor cows that they are selling. I think sanitary inspection has been one of the most important steps. I have visited factories after the inspectors have been there, and I have found them properly fitted up, and there was no more trouble about getting the nicest, sweet-smelling flavor. We must always realize that there is a higher plane to be reached. I hope you will get great benefit from this meeting.

Whenever Mr. Barr wants to come into our establishment he has the run of the place. He has the privilege of inspecting any butter or cheese in the place, and if any factories want their make inspected it can be done without any trouble.

I hope this Dairymen's Association will legislate against whey butter. We already have legislation against oleomargarine. I have not yet seen a first-class article made from whey, and if you start putting it on the market you will injure the reputation of our creamery butter. (Applause.) I think we are justified in asking the Government to prevent any manufacture of whey butter.

Hon. Nelson Monteith being called upon by the chairman, said: I am sure it would be quite unkind of me at this stage of the meeting to make any lengthy remarks. I hope at a later period of the day to have an opportunity of speaking at greater length. I am pleased, indeed, to have the privilege of meeting with the men and women who constitute a great part of the constituency of eastern Ontario.

I sometimes feel, in disputing as to the amount of money we can afford to give to the dairymen with my colleagues, as to whether we always get value. I am glad to come down here this afternoon and get renewed enthusiasm, and go back and fight for what I believe to be your interest in getting larger grants. (Applause.) If you will just take home and put into practice what you have heard this afternoon in regard to the various features of the dairying industry, I prophesy that instead of our dairying products being valued at $100,000,000, they will amount to $200,000,00. It is not so much what you think as what you do. Action is the sum total of life, and if you here to-day resolve to do a great many things, remember that your resolves will amount to naught, except you put them into execution;

and that is my word to you—to apply what you have heard as closely as you can. I feel it is up to the producers and the farmer on the back concession to meet with us and respond to our efforts in carrying forward to a greater degree of excellency this important branch of agriculture. I thank you. (Applause.)

ROUGH DIAMONDS.

By Thos. McGillicuddy, Department of Agriculture, Toronto.

A friend of mine made a trip around the world, and one day was riding on the back of a camel along the bank of the Tigris, when the following story was told to him by his guide:

Many years ago in the far east there lived a farmer named El Hafed, who had land, and flocks, and herds, and a comfortable home. But he was discontented, and told his regrets to an old Buddhist priest who happened to be visiting the place. "If I could find plenty of gold," said El Hafed, "I would dispose of my farm, and live at my ease in the city, and be happy, for there is nothing so valuable as gold." "Gold is a cheap thing compared with diamonds," said the priest in reply; "you would be rich for life with a handful of diamonds." And then he told El Hafed about diamonds; what they looked like, and where they might be found. The latter grew more dissatisfied than ever, and soon sold his farm and belongings, and went hunting diamonds; but he never found them, and, at last, poverty stricken and broken hearted, he flung himself into the sea and perished. Next year the old priest visited El Hafed's successor, and noticed on a shelf a peculiar stone. His eyes glistened with surprise, as he asked: "Where did you get that?" "Out on the farm, near the creek, when watering my camels, "said the farmer; "the place is full of them." The priest caught his friend by the hand and danced around the room with joy, exclaiming: "Why, man, your fortune is made. Diamonds! Diamonds!! Diamonds!!!"

Then the guide flung his cap into the air, and said: "If El Hafed had stayed at home and tilled his own land with his eyes open he would have been the wealthiest man of his time."

The Farmer is a Rough Diamond. Emerson says: "The true test of civilization is not in the census, nor the size of the cities, nor the crops, but in the kind of men the country turns out." The farmer is a rough diamond. But—

"A diamond in the rough is a diamond sure enough,
And before it's ever polished it's made of diamond stuff;
Yet, somebody must find it, or it never will be found;
Then somebody must grind it, or it never will be ground.
But when it's found, and when it's ground, and when it's polished bright,
That diamond everlastingly is giving out its light."

May I be permitted to quote from Tom Watson's "Life of General Jackson" an eloquent and well deserved tribute to the pioneer farmers who opened up the American wilderness. The words are equally applicable to the early settlers who found this Province a forest and left it smiling fields:

"The historian, the orator, the painter have been eager in the duty of blazoning the deeds of our pioneer missionaries, lawmakers, and soldiers. The names of these heroes live, and deserve to live, in letters of light upon the records of our country. But to our pioneer farmers justice has never been done. Theirs was a combat calling for every soldierly trait of Capt. John Smith and Miles Standish. The patient courage which swung the axe in the depths of primeval woods was no less heroic than the bravery which made the musket conquer. The toil of the warrior's march was slight by

comparison with the homely but exhausting work of preparing the soil for the sowing of seed. The arrows of the red men were not more deadly to the soldiers than the fevers which arose from the swamps and pulled down the settler as he struggled to open out his farm. The story of the pioneer plowman is one of dauntless courage, of quiet heroism. He found this New World a wilderness, and he has well nigh made it a garden. His axe, his spade, his hoe, his muscle, his brain, his very heart and soul, have all been enlisted in the work."

There are about 170,000 farmers in the Province of Ontario. Most of them may lack some of the social graces that mark the dwellers in the cities, but they loom large in character. Our Governments recognize that they are rough diamonds, and are trying to find them, and grind them, and give them the polish that their personal and intrinsic worth deserves. For this reason we have our Agricultural Colleges, Experimental Farms, Farmers' Institutes, Dairy Schools, and well subsidized Associations for every branch of agriculture. At these gatherings farmers rub together—"diamond cut diamond"—and so get a mutual polish.

But, best of all, the farmer is finding himself. He has awakened from a sleep of prolonged infancy, has learnt that he is of age, and has come to claim his own. He now knows that—

"A diamond in the rough
Is a diamond sure enough,"

and he is beginning to appreciate the best polishing processes. Some of these agricultural diamonds have been found and ground, and have been scintillating in the public light. The Canadian farmer has commanded attention within our legislative walls, in the halls of education, and upon the public platform. Look at such names as Mills, Drury, Dryden, Monteith, Fisher, Robertson, Ruddick, Creelman, Zavitz, Dean, Day, and a host of others, who have made a reputation for themselves and for Canadian agriculture. And at the present moment a number of promising young men from the farms are in training under the eyes of our Governments, getting an academic polish at Guelph and elsewhere, and some of these are destined to bring still further glory to the sons of the soil.

There are Diamond Values in the Farmers' Working Plant. The amount of money invested in agricultural land, buildings, implements, and live stock—practically the farmers' working plant—is of surprisingly large value; and these values are genuine. The farmer never waters his stock to deceive the buyer—except, perhaps when he is selling his steers by weight. (Laughter.) The money invested in the farm equipment of this Province is given as follows in the last published report of the Bureau of Industries:

	1906.	1901.
Land	$661,199,920	$585,384,294
Buildings	273,414,187	226,575,228
Implements	71,197,619	59,897,513
Live Stock	183,307,394	129,496,261
Total	$1,189,119,120	$1,001,323,296

This total of $1,189,119,120 is equal to seven times the assessed value of Toronto, the capital city of this great Province. It means, also, an average of about $7,000 for each farmer. It is interesting, too, from a social, financial, and economic standpoint, to observe that this immense amount of rural wealth is much more equally distributed than in the case of any other class of people. In the cities, great wealth and great poverty are to be seen, often side by side. But among farmers, while there may be

no great wealth there is no poverty. During the five years 1901-1906 the value of the working plant of the farmers of Ontario has increased by about $188,000,000, or fully an average of $1,000 for each owner of a farm.

Field Crops Have Diamond Values. The field crops of the Province for 1906 were valued at $144,570,075, an increase of $16,244,427 over the showing of 1901. Some of these crops are rough diamonds, so to speak, and by skilful feeders are turned into the more polished balanced ration. They are fed to dairy cattle and other live stock, and in this way the richness of the land is maintained, and even increased. By growing clovers, peas, and other legumes, up to date farmers are also able to snatch and store nitrogen from the air, and thus give added wealth to the soil. The silo this winter is also proving a sort of diamond mine to some farmers.

Live Stock have Diamond Values. The value of live stock in Ontario, in 1906 was $183,307,394, a gain of $53,811,133 compared with 1901. The live stock sold or killed in 1906 were valued at $61,528,288, which is equal to one-third the value of the stock kept on hand. This fall and winter there has been an unusually heavy slaughter in both animals and prices; but many old and light milkers have been thus disposed of, and it is more than likely that some dairymen will be able to say with the Psalmist that it was good for them that they were afflicted, for in this way selection has been forced upon them. Considerable of the live stock sold have been of a class similar to that described by a railway adjuster of claims, who remarked that it seemed to him that nothing improved the value of some breeds of live stock like crossing them with a locomotive. (Laughter.)

Milk, Butter, and Cheese have Diamond Values. In this connection we may regard milk as the rough diamond, and butter and cheese as the polished articles. There is said to be a danger of Niagara decreasing in its flow, but everything points to an increased milk flow in this Province. The town and city milk supply is becoming a most important feature of Ontario dairying, and it never has had a real part in the deliberations of this body. Is it not time that a place for the discussion of this topic was given on our Convention programme? The production of clean, well-flavored milk for urban consumption, to be delivered regularly, promptly, and in best possible condition to the consumers, is a problem worthy of the best consideration of dairymen of every class: for the larger the town and city use of milk the better price there will likely be for milk for creameries and cheese factories.

According to the last Crop Bulletin of the Bureau of Industries, there were 1,152,071 milch cows in Ontario in 1907. It is claimed that the average annual yield of milk per cow in this Province is about 3,500 lbs. This would make the total milk yield nearly 4,000,000,000 lbs., worth about $40,000,000. This immense yield could be greatly increased at a small relative cost by a system of testing, culling, and general selection. It is calculated that the first 3,000 lbs. of milk given each year by a cow is only about sufficient to pay for her keep, which means that many cows give little or no profit to their owners. The profit, then, must come from what the cow gives over this actual cost standard of 3,000 lbs. In that case the Holstein cow Boutsje Q. de Kol Pietertje of the Ontario Agricultural College dairy herd, must be a gem of the first water—if one may dare to use the word "water" in connection with a milk yield. This excellent animal, during the twelve months, October 27th, 1906, to October 26th, 1907, gave a total yield of 20,778 lbs. of milk. The butter fat averaged 3.76 per cent., varying from 3.0 to 4.3 per cent. and totalling 781.91 lbs., (or the equivalent of 912.22

lbs. of butter), valued at $190.38. During the thirty days of November she gave 2,522 lbs., compared with an annual yield of 3,500 for the average Canadian cow. In one week she gave 643 lbs., and in one day's milking she yielded 96 lbs., of milk.

Now, a Boutsje, like a Kohinoor or a Cullinan diamond, is not to be picked up every day. But selection, testing, and feeding will be sure to improve any herd, and so make the chances of finding another Boutsje more likely.

Our Factorymen are Rough Diamonds. The men who manage the butter and cheese-factories of Ontario deserve consideration and support. They have done much to bring credit and gain to Canada by the excellence of their product. Our Dairy Schools are doing much to inform and polish them. May they be more than ever ambitious to excel in the markets of the world. Long may they give to us the cheese that we delight to taste, with its exquisite nutty flavor and mild, fetching tang, and that tender, mealy yet firm body that dissolves upon the tongue like a sweet dream on the waking mind. And ever may our creamerymen make for us that glorious butter which reminds us of the odorous breath of the cow and the aroma of the sweet-scented clover pasture, and whose delicious flavor lingers on the palate like the memory of a first love.

OPENING SPEECHES AT THE EVENING MEETING.

President Dargavel: This Association feels very much gratified at the reception it has received at Picton, and the success of the convention. When we were invited to come here we had some little hesitation in accepting. There were several other towns anxious that we should hold our convention with them, but we thought that Prince Edward County deserved recognition on the part of the Association, and we had on the Board for years a very enthusiastic director, Mr. James Anderson, whom you all know, I presume. (Applause.) And he was very insistent that we should go to Picton, and we had learnt to know that anything Mr. Anderson sets his mind on he is pretty sure to get, and we also knew he was an active member of the Association, and had done a great deal for the Association, and that he deserved some recognition. I can assure you that we have not regretted the decision that we arrived at. We have never visited a place where we met with a more cordial reception and apparently a deeper interest has been taken in our work, and it is a great incentive to us to come to a place where our work is appreciated. Last year we had quite a different experience. We held our meetings at the city of Ottawa. They have very many other attractions there, and perhaps they did not have a James Anderson in that section to liven them up and get them interested. I think perhaps, that has something to do with it. At all events I must say the reception we met with there was of the opposite character to what we have met with here. We have brought here the best talent we could procure in Canada, and some from the United States, and we hope that this meeting will be a benefit to the dairymen of this section. I am sure the people of Picton are greatly interested or they would not turn out in such great numbers to hear the addresses. I am very pleased that they have manifested the interest that they have. It is another example of the intelligence of the people of Picton. It is a remarkable fact that in some towns the people do not seem to appreciate what the advancement of the dairy interests and the agricultural interests

of this country means to them. While we do not belittle the interest of the manufacturers, because we appreciate the wonderful growth of manufacturing in this country, and how necessary they are to the welfare of the towns and cities, we must remember that the prosperity of this country depends upon the farming community. We hope the good Lord will bless us next year with a favorable season, and that the lessons that we may have learnt from the little setback we had this year will be a benefit to us, and that we will go forward in the future with greater strides than ever, and that the year 1908 will be a record breaker for us and the agriculturists of this country, and thereby to the interests of every person, be he engaged in commerce or manufacturing pursuits of any kind. I thank you again for your enthusiastic assistance to the meetings that we have held in this town. (Applause.)

Rev. Mr. Emory, Picton: I would like to say that I appreciate very much this courtesy and consideration extended to me on the part of the convention, but I remember the advice my mother gave me once. I asked her a question, I shall not tell you what it was, but her answer was "Never abuse parlor privileges," and I shall not abuse platform privileges to night. There are those who have come from afar to speak to you, and I shall not so far forget myself as to trespass upon their time or upon yours. I would like to say, however, that I have enjoyed very much the sittings of this convention. It is a privilege to listen, and I may say that I have not been a disinterested listener; I have been an interested listener, and I have been a pleased listener, and I have been a profited listener. Anything that can be done for the farmers or the producers is of the very highest profitable assistance to the state, for the farmers are at the very heart of all national prosperity, and are indirectly related to all other prosperities and to all institutions that cluster about a nation.

We have no regrets, I may say, that we placed our church auditorium at your disposal. We are thankful and we are glad; and all I have to say is that we are glad you came, we shall be sorry when you go away, and we shall be glad to have you come again. (Applause.)

Senator Derbyshire: It is very seldom that we have to apologize, but we regret that Prof. Robertson will not be with us. I have just received a letter stating that it will be impossible for him to be here. On account of the great work he has done in connection with the dairy business in the Province of Ontario and throughout the Dominion we would have liked to have had his presence with us to-night. We recommended James W. Robertson as Dairy Commissioner for the Dominion because we knew he would be the right man in the right place, and we are proud of the position he occupies in the Dominion of Canada to-day. He has been selected to take charge of that great Agricultural College at St. Anne de Bellevue, Quebec. It is very seldom that we are disappointed in our speakers, because they are all glad to be with us, and feel that it is an honor to address this Association. I want to say, however, that we selected out of one of the factories of my good friend Mr. Macpherson a modest young man named Ruddick, and we started him out as one of the instructors to educate the makers in the factories as to how to make fancy cheese, and it was not long before he was selected to go to Ottawa to help the Dairy Commissioner there; and then they got word of him in New Zealand and took him over there to help them. But when we saw the style of man we had lost, we put up more money than these people dare pay, and brought him back, and he is now in charge of the great dairy work of this Dominion, and we feel proud of him. We feel proud, because the Eastern Dairymen selected this style of man to do this work. I am delighted with the reception we have received.

ADDRESS.

By Prof. R. A. Pearsons, Cornell University, Ithaca, N.Y

I have felt since coming here that I am among friends. I heard a new definition of friends a short time ago. A little girl was asked what friends are, and she said "Friends are people that know all about you, but they like you just the same." (Laughter.)

This is a very large audience. I would give a good deal if I could take a real good picture of the inside of this church to take back to our friends who are doing a little dairy work on the other side of the line, in New York State; I believe it would encourage them.

I am impresesd to-night by the fact that our industry is one of dignity. This audience makes me feel that way. I believe the dairy work is good enough work and large enough work for the best of us. Out in one of our western states some of our people felt the same way. One of their best men was chosen to represent that state, and he had to leave dairy work and go to Washington as a Senator, and a gentleman in the town said it was too bad for a man like that to be a Senator when he might be a dairy farmer. (Applause.)

I would like to impress one thought upon you, and it is this: That there is a great wave sweeping over the world that may be called the wave of sanitary reform. The good people are calling for more sanitary water for our cities, better ways of disposing of our sewerage, and they are demanding more sanitary methods of plumbing, even the physicians now have to conform to certain sanitary requirements which were unthought of a few years ago, and along with all these sanitary requirements they are asking for cleaner milk. We have heard a great deal about clean milk to-day, and we are going to keep on hearing about it; and you might just as well try to stop the talk about clean milk and better sanitary methods as to go down to the Bay of Quinte and try to sweep the water out of it. It is coming, and if you want to blame somebody for it, I will tell you who to blame. Just keep going backwards for 250 years, and back there you will find a Dutchman named Van Leeuwenhoeck, and when you catch him punish him; he is to blame. He had the habit of grinding glass into different shapes and forms. When he got a certain combination of lenses, and looked through them, he discovered that there were things to be seen that had never been dreamed of, and he is the man who is responsible first of all for our knowing something about bacteria. If you are not satisfied with punishing him, then go to Dr. Connell and men like him, who are in search of scientific truth and who are determined to announce it, whether it hurts anybody or not. Punish them if you want to. Science and truth cannot be stopped. We are learning science. What are we going to do about it? Why, there is only one thing for a sensible man to do when an argument is presented to him, and he is convinced that it is right, and that is, to acknowledge it and act accordingly. There is money in this new idea of clean milk production. I could tell you of many men who are getting money out of it. I will refer to only one, because he was one of the first in our country to become prominent in the work. Mr. Stephen Francisco was a poor dairyman in New Jersey about ten or fifteen years ago, serving milk from one or two little wagons, and driving one of them himself. About that time this sanitary wave struck his town, and the physicians were looking around to find where they could get milk that was reasonably free from bacteria, and they picked out Mr. Francisco as the man that might satisfy them. He

agreed to do what they wanted, and they agreed to recommend his milk. To make a long story short, to-day Mr. Francisco has 500 cows upon his farm; 700 acres of land, and is selling his milk for nine cents a quart. It passes through no middle man. He is the director of a bank. His children have all gone to college. The family go abroad when they want to; they ride around the country in automobiles, and he is one of the leading citizens, and one of the most successful men in the place, and he made it all out of clean milk. (Applause.)

So I want to say to the dairymen of this country. Do not shy at the world's movements, try to profit by them. They are bound to come; and if you do not recognize them and act accordingly, they are going to push you right over and out of the way.

In our country we do all we can to encourage the production of clean milk. We try to emphasize the fact that milk may be contaminated in four different ways. It may be contaminated by the insoluble dirt that comes out on the strainer; and it may be contaminated also by soluble dirt; it may be contaminated by bacteria; and it may be contaminated by the product of bacterial growth. There is no way of treating milk that will overcome this contamination. The only treatment is exclusion, and of all the methods that I have seen suggested and tried, aside from getting rid of the worst of the dirt, the best is the use of the small top milk pail. I do not know whether you are using it here or not. By using that kind of pail you will keep the dirt from falling in. If one is in the habit of using a pail fourteen inches across the top, and gets one half that size, it will keep out a great quantity of dirt. I sent one to a farmer and asked him to try it and he sent back word that he could not get half the milk into it, and I guarantee that that man could direct a stream of milk from its source into a cat's eye. (Laughter.) I asked him to try the pail a little longer, and in a week he wrote and told me the pail worked pretty well. We find it keeps some of the dirt out of the milk and the farmers are getting so that they can use it pretty well, but there is one serious objection and that is if the cow gets her foot into the top part of the pail you will have to saw off her leg to get the foot out. (Laughter.) Prof. Pearsons then gave an exemplification of bacteria similar to his speech delivered in the afternoon and it was very much appreciated.

The CHAIRMAN: I have now much pleasure in introducing the Hon. Nelson Monteith. He is one of the best friends of the dairymen and I believe it was largely through his efforts as Minister of Agriculture for the Province of Ontario that the Government took over the entire cost of the instruction in dairy work, thereby enabling every factory to have an instructor. I am sure you will be delighted to listen to what he has to say.

DAIRY ADVANCE.

By HON. NELSON MONTEITH, MINISTER OF AGRICULTURE, TORONTO.

It is with much satisfaction [here the speaker was presented with a beautiful bouquet of roses by a little girl, whom he very gracefully kissed]—I think I must now say with a double satisfaction—that I find myself among the good people of Picton and of Prince Edward County. It is my first privilege as a public servant to meet with the good people of this fair part of the great Province of Ontario. When memory goes back to the early history of this Province I must feel that I stand on sacred ground. In this

grand old county of Prince Edward we find the first experiments in agriculture in the Province of Ontario. Here came the men from the neighboring colonies, and started to hew out for themselves homes upon the shores of Lake Ontario and the Bay of Quinte. Here was first tried the experiment of wringing from the stubborn soil that sustenance that has brought about the ideal conditions that we see manifested on every side. Here, we may say, was first grappled our earliest efforts at municipal government—a system of local self-government unrivalled in the history of the world (applause)—a system under which the individual can make himself most effectively fell. I might also refer to the fact that you have early believed in the value of co-operation in this county. You first started an agricultural society in the year 1833; through the agency of that society you introduced pure breeds of sheep, cattle and swine, and made the foundation of the greatness we have now attained in the dairy industry. This shows that you have come of a far-seeing, progressive stock of British people, and I might say that in looking out on this splendid audience I feel that we in Ontario have much to be proud of in our triumphs in the various lines of agricultural progress.

I do not desire to flatter, but I feel as I regard the splendid specimens of manhood and womanhood around me to-night, that in this temperate zone we have the climatic tonic which brings out the best energies of the people, for we have it exemplified in the intelligent faces that I am surrounded by to-night. (Applause.) And while we may not be great in numbers in Canada, yet, quality tells, and that is one of the things I wish to emphasize: the importance of quality in every line of production.

When we come to consider what has been accomplished in the last 100 years in this part of the Province of Ontario, I feel that there should be memorials planted on almost every cross-road to the men who have hewn out and brought about this that we now enjoy. I feel that we are too recreant in our duty, too forgetful of the lone struggle of the axe-man in the ever widening clearing. These are the feelings of one who has had told to him the privations, the difficulties, and the dangers incident to pioneer life. When I go, in the performance of my duties, to the outlying districts of this Province—to the northern and north-western portions—I find there pioneer conditions, and pioneer conditions entirely different from that of our forefathers in this older part of Ontario. While there is the isolation largely incident to frontier life, you have within easy reach the means of ingress and egress through the ever extending lines of railways.

We have a vast and unoccupied area in the northern portion of this fair Province, an area as yet little considered, little thought of, an area that is now being threaded by railways, and I believe in the near future will be thrown open for settlement under conditions which will give Ontario's sons ample opportunities to dwell in this old mother Province of Ontario. There we have stretching out, east and west, north and south, an area almost as large as the occupied portion of this old Province of Ontario, from Ottawa to Windsor—an area of between 16,000,000 to 20,000,000 of acres, and judging from what we have observed during the past year I believe it is capable of supporting a vast number of people. This splendid territory, we hope, will be occupied by Ontario's sons and daughters. This is one of the resources of this great Province. I, for one, would not be anxious to fill it promiscuously with a foreign population; because we believe that quality tells. Men imbued with the same idea of freedom—freedom in every sense of the word—are worth more to us as people than thousands of those who have no appreciation of what freedom means.

At the present time we look upon this Association as a strong auxiliary force working in unison with the Department of Agriculture, over which your humble servant has the honor to preside. We look upon it as an enthusiastic body of men working hard without hope of reward other than the satisfaction of doing a patriotic duty, and to these men all honor should be given. And to the ladies who scald faithfully the milk can from day to day, due tribute should also be given, because, after all, the gospel of cleanliness that our friends have been preaching here to-night, is of the greatest importance, and it has to be carried out by the women folk of the Province. (Applause.)

I wish to pay tribute to the faithful services of Mr. Publow and Mr. Mitchell in the East, and Mr. Hearns in the West, for their untiring efforts to see that the great dairy industry keeps forging to the front. I also feel somewhat of a paternal interest in the men who are driving along the back lines visiting the outlying factories, and preaching, not only the gospel of cleanliness, but that more skill and knowledge should be put into the product which comes from these factories. These men deserve well at our hands. Those who work in the farm stable or the barnyard, who see that the best conditions are maintained in the proper handling and production of milk, also deserve commendation for their efforts, and as a son of the soil I feel that we cannot emphasize too often or too strongly that the growth and prosperity of this industry depends upon the more skilful ability of the men who are growing the crops. Those of us who recognize this phase of the dairy business know that except we can introduce cheap production we cannot meet the competition as we should, and that cheap production can only be introduced by putting greater skill into our business; because, after all, skill is about the only thing we can sell at a profit.

I feel that we have to thank the ladies of this district for coming out and paying such a tribute to the great and honorable calling of agriculture. The dignity of a calling is its utility, and I for one, appreciate very much the fact of the ladies coming out and gracing this occasion by their presence. It is an incentive for us to go forward and do greater things, to conquer in fields yet unwon, and I trust as years and years go by that the ladies of our Province will still rise more and more to an appreciation of the dignity of this great calling of agriculture.

It was my good privilege to visit one of the Royal Agricultural Societies in old England, and while there I was much struck by the knowledge and interest displayed by the best class of old England in agricultural pursuits; and I feel that as time goes on, and as we rise to a proper idea of the dignity of this noble calling of agriculture, it will be more and more appreciated by every class in this great land called Canada.

The time is coming, and must surely come, when to be a land owner will tend to stamp a man as a man of affairs; and while we do not desire any class distinction such as they have in the old land, still much will be implied in the fact that a man is a land owner. Not only that, but when our manufacturers acquire wealth, as many of them are doing, they will seek that outlet for their energies and wealth and turn to agricultural lines, as it is in the old land, and with increased postal facilities, telephone facilities, and rural mail in the future (applause), I trust that farm life in this Province of Ontario will be much more comfortable and will be a good business to be engaged in.

I was much struck with what our good friend from the neighboring state said to-day when he spoke of hard drudgery. I have spent many years on the farm, but I have never yet felt that it was a life of drudgery, because

I was interested in what I was doing. (Applause.) I am sorry for the man who is waiting for the clock to strike at the end of the day. For me the days seem to end too soon, though I do not believe in long hours. Be interested in your business, and it will ease half the load of life. Put enthusiasm into your work and it will lighten the burden, if there be a burden.

My sympathy never went out to men of idle life so much as it did during the past year. I used to think what an ideal life it would be to sit around some of our first-class hotels and enjoy life. My ideals in that regard have been entirely shattered. I feel sorry for the man who has nothing to do; because, the man who is interested in some calling, and takes pleasure in it has one of the greatest joys of life. The joy of overcoming obstacles is one of the greatest joys that is given to man, and I believe the dairymen appreciate this. I trust this spirit may be abroad among our directors.

I must confess that the Hon. Senator Derbyshire and President Dargavel and the others who came to see me with regard to the matters of inspection and instruction succeeded in impressing me with the necessity of this work. The first fear I had was of getting through the estimate for such an increased grant; and then I felt that we might be infringing on the rights of the people if we said to them: "Here, you do this and you do that." But the more the matter was turned over and weighed, the more I became impressed that it was for the good of the whole people, and that should be the first consideration. (Applause.) And after a good deal of fatherly advice to the men entrusted with this important work of going out and inspecting and instructing—and I followed their work with a great deal of sympathy—I have found that after making up the roll this fall that we have undoubtedly made a step in advance. (Applause.) I find by the official reports on the quality of our cheese that it is as a general rule excellent, and this is almost entirely attributable to the work of inspection as carried out by our able staff of inspectors and instructors; and at this stage of the proceedings I would give fair notice that we trust that the lines may be drawn a little bit tighter and no great harm result during the coming season. It is our desire that our cheese shall stand unrivalled in the world's markets (applause). and I feel that we would be disloyal to this great Province of Ontario and to the Dominion of Canada and the grand old flag under which we live if we should shrink from doing our duty once we know it.

Just a word and I am done. I think the opportunity is at hand to say a word or two regarding the great movement that is abroad in our land, namely, the effort to better our homes through the medium of the Women's Institutes. These Institutes are gathering strength unexpectedly. I believe the homes of our people are equal to the homes of almost any other people. but we want those homes to be better than those of any other people, and that the best regarding food and clothing and sanitation should be known throughout the length and breadth of the country among the women of our country. I believe the opportunity is offered to the women of this county of Prince Edward to join with our Farmers' Institutes and take initiatory steps to organize, and they can depend upon it that the Department at Toronto will help them with their work in a financial way. (Applause.)

We believe, as it has been exemplified in these gatherings during the last day or two, that the coming together of people tends to broaden the mind, and tends to send us back to our homes with increased vigor and increased knowledge of our business. But, while it is one thing to know. it is another thing to do, and what we want is that this vast fund of information that has been so willingly given from day to day will be exemplified in concrete practice in our homes, in our dairies, and in every walk of life.

I thank you, Mr. Chairman, for this opportunity of meeting with the people of this part of the Province. It has been my fortune to meet with the people of the east and west during my short tenure of office, and I can say without flattering that it has not been my privilege of speaking to a more intelligent or comfortable looking people than I am privileged to speak to to-night. (Applause.)

A TRIP AROUND THE WORLD.

Mr. J. A. Ruddick gave an illustrated address on what he saw in connection with dairying in his travels around the world. This address was illustrated with lantern slides, and was very much appreciated.

Mr. McLellan, manager of the local branch of the Metropolitan Bank, moved a vote of thanks to the convention for coming to Picton and providing such an instructive and entertaining programme for all.

Mr. Dolan, of the High School staff, seconded the motion, which was heartily carried.

President Dargavel: This motion, I imagine, is rather out of place, but we receive it with thanks. The thanks should rather have come from this Association to the people of Picton and of the County of Prince Edward. We feel indebted to you for the more than courteous reception that we have received, and the hospitality with which we have been treated here. Not only have we been treated with a great amount of hospitality as an Association, but as individuals we received the hospitality of the citizens of this town; and while we are free to say that we have met with many fine receptions the last few years—because the people of this country, I find, are beginning to appreciate the work of this Association—I must say that this has been the finest convention we have ever had. The people of Belleville treated us very generously, and when it was voted that we should come to Picton, many of us, myself among others, who had not visited the place before, had certain doubts as to whether you could accommodate the Association, but we have heard of no one going hungry or going cold or without a good place to rest. A wonderful advancement has been made in the science of manufacturing cheese, and we think this Association has done its best. We have striven at each one of our conventions to bring the best talent to speak to the people in the way of instruction. (Applause.)

RESOLUTIONS.

Moved by Senator Derbyshire, seconded by Geo. A. Putnam, "That this convention of dairymen assembled, wish to express their deep gratitude to the citizens of the town of Picton for their able and energetic assistance in making this convention the greatest ever held in Eastern Ontario, and for their untiring zeal and thoughtfulness in looking after every detail in connection with the entertaining of their guests." (Carried.)

Moved by Henry Glendenning, seconded by J. H. Singleton, "That this convention of dairymen assembled do hereby tender their hearty thanks to the railway companies for the splendid accommodation accorded the dairymen attending this convention." (Carried.)

Moved by JOHN MCGREGOR, seconded by EDWARD KIDD, "That this convention urge upon this Dominion Government the desirability of taking a census of cattle (cows), and the make of the butter and cheese, both in the factories and on farms throughout Canada." (Carried.)

Moved by A. A. AYER, seconded by J. H. SINGLETON, "That this convention of dairymen assembled in the town of Picton, would strongly urge upon factory men the necessity of branding consecutively each vat of cheese with a designated number. The same number to be placed upon the boxes as upon the cheese in order that a fair and proper inspection of each shipment may be made, both by the buyers and the official referee at Montreal." (Carried.)

Moved by HENRY GLENDENNING, seconded by T. A. THOMPSON, "That this convention urge upon the Dominion Government the desirability of taking such means as may be necessary to insure correct returns from the railroads and boats of the daily receipts and shipments of butter and cheese into and from Montreal, and that the same returns be handed to the Board of Trade daily." (Carried.)

Senator DERBYSHIRE: For a great many years we have been trying to do exactly what is done this year, and still we have been unable to do it; but with the pressure of the President right at the foot of the Government in Toronto, we have been able to shove the business through this year. And while in other years there was no Minister of Agriculture who could stand up for a minute and discuss with the dairymen why they should not take over the entire dairy instruction work, the same as they do in the schools, they would not do it, we got the Government to do it this year, and I have great pleasure in moving, seconded by Mr. Anderson, "That this Association desires to express its gratitude to the Hon. Nelson Monteith, Minister of Agriculture for the Province of Ontario, for taking over the entire work of instruction and inspection." We believe that the good results which have followed have fully justified the Government in such action.

The PRESIDENT: As Senator Derbyhire has remarked, this is a very important resolution. Of course, the resolution itself is only a matter of courtesy, but the action which was taken by the Minister deserves the gratitude of every dairyman in the Province of Ontario. It is not alone the small matter of twelve or fifteen dollars to each factory, nor the great amount which was involved, perhaps some $15,000, but the great benefit accruing from the action taken by the Government was this: that there were about two hundred factories in the Province of Ontario that did not receive any instruction, and they were the ones that required it the most. Now, the reason these two hundred factories did not receive any instruction was that they do not contribute anything, and they would not join the syndicate, as they were not public-spirited enough to put up fifteen dollars to have their factories instructed or inspected. But it turned out they were wanting instruction far more than the better factories that were paying this amount. It is a great mistake to think that we are interested only in the products of our own factory. We are interested in every factory in Ontario, and the results flowing from the action of the Minister of Agriculture will be of great convenience to all.

THE CREAMERY OUTLOOK.

By James Stonehouse, Dairy School, Kingston.

If the past season was a disappointing one to the cheese-makers it has been none the less to the creamerymen. Expenses are growing heavier year by year, and the output is not keeping pace with the expense. In fact, there was a heavy falling off in production during the past year, and I might mention two or three factors which tended largely to bring about this result.

1st. We had a cold, backward spring, and feed was very scarce till about the middle of June. Consequently there was not the usual amount of cream to be had even if the farmers had been disposed to send it, but the cool weather and high prices for butter induced the farm people to churn their own cream.

2nd. The weather continued very cool all summer and where the farmer's wife was disposed to market her own butter, there was no extreme heat to prevent her from doing so.

3rd. The scarcity and consequent high prices offered for dairy butter caused a great many to make their own butter. There is a somewhat curious fact in connection with this last statement. When butter is selling high more women are anxious to make their own butter than when it is selling low. My creamery is always better patronized when butter is low in price than when the price is high. The reverse should be the case, for the patrons are less able to afford the price charged for making when the selling price is low than when it is high.

The market conditions varied considerably from those of the previous year. In 1906 the demand from Great Britain was good and prices were satisfactory. The price of creamery ruled the market for dairy butter, but during the past year the price of dairy seemed to have ruled the price of creamery butter, and I have never seen the price of the two grades of butter so near together as they were during the past season.

The explanation, to my mind, is that all grades of butter were too high for profitable export. Creamery butter more than supplied the home demand, and in the absence of a foreign market there was never a brisk demand for creamery. On the other hand, dairy butter was always in strong demand, and that part of the consuming public which prefers dairy butter seemed to be able to keep the supply exhausted, and consequently the demand was strong all through the season, thus bringing the price of dairy to within a cent or two of creamery for the greater part of last season.

Our large increase in population during the past two years has undoubtedly been a strong factor in keeping up prices, and it looks as if the same agencies will cause prices to maintain a righ level for some time to come.

The question of moisture in butter has been agitating the minds of a good many butter-makers in Canada during the past year or two, and the quality of the butter from some creameries has not been improved by the over-weening desire to incorporate a large amount of moisture and have a large over-run. The conditions necessary to incorporate an excess of moisture are usually detrimental to the quality of the butter and should be discouraged. The quality of the cream as it comes from the patrons is a matter of far greater importance than the incorporation of an excess of moisture, and it is the rock upon which our butter industry must be built if we are to take our proper and possible place among the dairy countries of the

world. I am finding out that intelligent and courteous cream haulers can do an immense amount of good along this line, and I am also finding out that the richer the cream the better the quality.

My routes vary from 25 to 32 per cent. and I invariably find the richer cream the best in quality. It is difficult to get many farmers to believe that with a rich cream, clean skimming can be done with a separator. This brings me to speak of a large number of experiments along this line which were conducted at the Kingston Dairy School during the past two winters, and also experiments along another line which are of interest to users of cream separators. Two years ago we took six different makes of separators and put each machine through nine different experiments to determine the effect of speed on the richness of cream and the skimming efficiency of the different machines, and we almost invariably found that an increase of speed from five turns of the handle lower than the indicated proper speed to five or even ten above the indicated speed, gave us a much richer cream and a cleaner skimming. In some cases we had a difference of over 20 per cent. in the richness of the cream in the same run just by increasing the speed of the machine by ten revolutions of the crank, and then some patrons wonder why their cream test varies from time to time when they never change their cream screw. We also put through a large number of experiments last year to determine the effect on the richness of the cream and the efficiency of skimming by allowing the milk to cool before separating. These experiments were suggested to me by the invariable lowering of the tests in my creamery when the cold weather comes on in the fall. We took milk at 80°, and would run a portion through three machines, and then raise the temperature to 95° and put through the balance. In just 50 per cent. of our experiments we had an average decrease in the per cent. of fat of 4 per cent. at the lower temperature (80°), and a heavy loss in the skim-milk. The cream appeared thicker and richer as it came from the machines, but the fat was not there. Our widest range was 9 per cent. lower at 80° than at 95°. We all know that a great deal of milk is allowed to cool down before separating in cold weather. A large loss of fat is the result, and often a lower per cent. of fat in the cream. Some agents claim that they have the only machine that will skim milk clean at a low temperature, but that machine is not made yet, and we do not need it.

In connection with our creamery butter business I have a little to say about this much talked of whey butter. Mr. Mitchell has been conducting some experiments this fall to ascertain the cost of separating a given amount of whey and thus finding the cost of producing a pound of butter. He ran two power separators three hours each on two different occasions and ran through 36,600 lbs. of water, consuming 900 lbs. of soft coal screenings at $4 per ton or a cost of $1.80 for coal. Taking three lbs. of butter per 1,000 lbs. of whey, the cost for separating, for fuel alone, would be about 1½ cts. per lb. of butter recovered. This work has been supplemented since the opening of the school and starting of the cheese-making, by obtaining whey and from which several lots of butter have been made, which on the whole was excellent in quality. It is the intention of our Superintendent to have considerable experiment work done along this line during the present term.

The dairy industry, and more especially the butter part of it, is indebted to Mr. Mitchell for doing away with some of the difficulties in testing cream. It is well known among creamery men that it is difficult to get a clear reading of cream without the addition of water, and where the 18.0 c.c. pipette is used the cream bottles are not large enough to hold the pro-

per amount of water, acid, and cream without great difficulty in mixing. Mr. Mitchell conceived the idea of a 9 c.c. pipette, and then doubling the reading. This worked well, but if there was an error made in reading the error was also doubled. To overcome this objection Mr. Mitchell has had cream bottles made with their graduation half the size of the old style but the size of the bulb remains the same. These work to perfection, as there is plenty of room for the contents to mix and the reading is taken without any doubling. The same amount of acid is used (17.6 c.c.) as a pipette of water is added to the cream. Futhermore, where this amount of water is used it not only washes all the cream out of the pipette but also prevents charring of the samples.

I have used these bottles, and I am of the opinion that creamery men will be well pleased if they discard the old style bottles and ask for the 9 c.c. pipette and bottles to correspond. They should not cost any more than the old style; in fact the cost of the first order of 6 dozen bottles from the Wagner Glass Works was only $2.50 per dozen, which is the regular selling price of the ordinary bottles, and as these bottles will not cost any more to make the selling price will undoubtedly be about the same.

Q.—What effect will the tightening of that screw have?

A.—That means the thickening of the cream. I must confess we do not change ours.

Q.—Do you ever have a difference in your test?

A.—We have never tested, but it appears that we have suffered because we did not. You perhaps are not losing anything by not changing your screw; but what I refer to is that the cream you get from your machine today might not test the same to-morrow, but you may get all the fat in your cream.

Q.—Will we get as good results if we separate the milk when it comes direct from the cow, as we do by warming the milk?

A.—Yes, I think you would.

Mr. Singleton: What is the best way to heat up after the cream has become cold?

Mr. Stonehouse: The best way is to put it in hot water, but the most convenient way is to set it on the stove.

Mr. Glendenning: We have found it satisfactory to take one of these ten pound honey cans that has no paint on, and fill it with boiling water and set the receiver in that.

Q.—What was your theory of the richer cream arriving at the factory in better condition?

Mr. Stonehouse: On account of there being less skimmed milk in the cream. We know that when we take a heavy cream and get a little skimmed milk in it, it is the skimmed milk that goes off, it is not the fat.

A Member: Mr. Warden asked the question the other day about his not being able to get his cream to churn; he could not make butter on the farm.

Mr. Stonehouse: There are a great many factors that come in. As a usual thing the cream had too much milk in it and the temperature is not high enough. There are a great many people who have the idea that there is a certain churning temperature of cream regardless of any other conditions. The churning temperature may vary all the way from 48° up to 70°, and if you have not got the right temperature for your own specific cream you will then have trouble in churning. With a thin cream we have always got to have a higher churning temperature, and I have never yet seen a cream that would not churn if the temperature was high enough. I remember one time at Guelph that cream was sent in, and the farmer's

wife said she could not churn it, and Miss Laura Rose put it up to 70°, and she had no difficulty in churning. It is possible that there may be one cow in a herd that would spoil the churning of the cream. Some cows if they have been milking ten months have milk that will not churn, and if that cream was mixed in it might prevent the whole cream from churning, and in that case it is well to keep out the milk from the cow that is affecting it in this way.

A MEMBER: I had trouble in getting the butter to come, and I stopped milking two of the cows, and then I had no trouble whatever. These cows had been milking eight or ten months.

A MEMBER: Do you think it makes any difference if you feed frozen feed to the cattle?

A.—I never had any experience with that.

Q.—Have you ever investigated the offending cows in order to ascertain why their milk will not churn?

A.—No; I cannot speak directly on that point. The two principal fats in butter become hard, especially in cows that have been milking a great while, and these fats will not unite together, but these fats have a melting point at about 140°, if you have a good proportion of the softer fat you could see the reason why you have to have a higher temperature to soften these fats so as to make them adhere.

Mr. ELLWOOD: Don't you think it would be well to mix a little of that fresh cream—would not that assist?

A.—That is all right with thin cream. It is never advisable to mix a thin cream with cream that is ready to churn.

Q.—What effect has acid on cream in the churning?

A.—With a thin cream we have always got to have a certain amount of acid, and our object in ripening cream is to give a little more flavor to the butter.

Q.—Do you think the keeping qualities of butter are as good if it is made from the sweet cream as if it is made from the cream that is ripened?

A.—I do not think there is very much difference if the quality of the cream is good. Prof. Dean has made experiments along this line at Guelph.

Senator DERBYSHIRE: Does butter want to be kept? Why don't you sell it and eat it up fresh? It is worth more money the first five days after it comes out of the churn than at any other time?

A.—Yes, I try to get my butter out of my hands within a week, because I have never seen a piece of butter that improved with keeping.

Mr. BARR: I agree with Mr. Stonehouse and Mr. Mitchell that dividing the sample in two is an improvement, but you are halving the sample, and you are only going half way towards the solution of testing cream, and instead of measuring with the pipette, I believe we should weigh every lot of cream we get in. I believe the men who have been sending poor cream and milk to our cheese factories and creameries have been getting the long end of the stick. We have not been giving the men who have been delivering the good cream and milk all the money they should get, and if you would weigh the cream each man would get his correct test, and I say we should recommend the weighing of every sample.

Mr. STONEHOUSE: Mr. Barr is right there. There is quite a little difference in the weight of cream testing 25 per cent., and cream testing 40 per cent., and the man who sends the richer cream is the loser no doubt. I allow a little on the pipette when I have a richer cream.

Mr. Barr: That is just why we should not do it that way. Mr. Stonehouse could not explain that so as to satisfy the patron. I say, let us have the right thing. In nearly all the States of the Union they are compelled to weigh the cream.

Prof. Pearsons: Here is one point where we are ahead of you.

HINTS TO PATRONS AND FACTORY MEN.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

I have been confined to no particular subject this morning, and a few thoughts regarding the different sessions that have been held may perhaps be of some interest and provoke discussion. There has not been as much discussion as there might have been at this convention, but I think that this has been due partly to the fact that the audiences have been very large. It has been my experience that we have more discussion when the crowds are smaller. I think it is a good sign when in a purely cheese district you have been taking some interest in the question of butter making. I judge that from the way you have discussed the very excellent paper given by Mr. Stonehouse; and though you may never make a pound of butter in this county, you have taken a deep interest in the butter question, because it has a good deal to do with the question of supply and demand. I think those who are engaged in making cheese should remember that, after all, the great business of dairying is a question of milk. And those who make cheese should study to some extent the butter end of the business with the view of becoming familiar with the conditions which affect the competition; therefore, I think it is a wise thing that this Association should give some attention to the question of butter making. I think it is a good thing for the different districts to make either one thing or another. There are certain sections in this county that have a good reputation for cheese, and get more for their cheese than other sections, and they should stick to cheese and develop that end of the business to the highest possible perfection. In some parts of the world they consider that there is a very great difference in the milk of the county and of the different farms. We lose sight of this in our factory system. In England where all the cheese is made on the farm, there is a very great difference in the quality of the cheese from different farms, and they have never been able to quite determine why that is so. They have taken the cows and exchanged them, and yet they have not been able to determine why they could get superior cheese on certain farms. It is largely a question of flavor, and usually attributed to a question of soil of these localities. We lose sight of this fine distinction in our factory districts, where the milk is all put together, but it brings about a greater uniformity, that is why the cheese made under the factory system excels that made under the dairy system. While it is possible to make cheese on a single farm better than it is made in the factory, yet, we have greater uniformity where the factory system prevails. Some districts are adapted to the making of cheese, and others to the making of butter. The Eastern Townships, for some reason or other, are able to make a finer quality of butter on the whole. Taken one year with another, the relative prices of butter and cheese have been very nearly the same; otherwise there would be an over production of the one article, and it is that which regulates the price. When butter is materially higher than cheese, there is a great deal more butter made than

cheese. The factories then turn the milk into butter instead of cheese, and that reduces the price by overtaking the demand. Some one remarked yesterday, that the markets of the world are available to the people of any country. We are now using butter made in New Zealand. With the increasing transportation facilities, there is not any chance for the demand exceeding the supply for any great length of time in any particular locality, because it can be brought from the ends of the world for a comparatively small cost. I think it is a wise thing for the dairymen of Eastern Ontario to stick pretty closely to the cheese-making branch of the industry. It saves a great deal on investment, if you avoid the double plant, and I think there is a very much better chance to develop the industry to a higher state of perfection when we stick closely to one line and specialize along that line.

My sympathies in this work have always been with the cheesemaker. No one knows the difficulties they have to contend with better than I do, and I must say that I think the man who gets the least out of the dairy business is the man who has made cheese and butter. I will go further than this, and say that I think the buttermaker has made greater advancement in his part of the business than any other man engaged in the dairy business—a great deal further advance than the man who owns the factory—and I think that is largely due to the system of instruction we have. It is the best organization in the world for the education of butter and cheesemakers. The instruction has been of the practical kind by actual demonstration, not only in the dairy school, but also by the men who visit these factories and the creameries. I think there has been too much talk; telling men how to produce better milk, and that they should do this and that. We all learn very much more by what we see than by what we hear, and the man who has an opportunity of seeing things done would learn a great deal more than the man who is simply hearing how things should be done; and if the work of instruction in connection with dairy work can be extended so as to give a more practical illustration, I think we would make a greater progress. That is why I believe the men who produce milk have not made as much progress as cheesemakers have. I believe the man who produced milk for the manufacture of cheese and butter in the country would do better if he paid more for the manufacture. I believe it is done too cheaply. I believe it would pay the man who produces the milk to be willing to give a slight advance, and then see that he gets value for his money. The man who produces the milk is the most responsible man in the whole business. There is no person in the county who has the same interest in the milk and its products until it finally reaches the consumer. I do not care if he sells it outright when it arrives at the factory; because the ultimate prices will affect the prices he can get for it at the factory.

You should never allow a patron to send milk to your factory if it has been rejected by another factory, because he will lower the standard of your factory. If we would understand our responsibilities in these matters half our trouble would cease at once. Factories should be properly constructed and provided with cool-curing rooms. The patrons would insist on having all these things if they properly understood the matter, and they would see that the management provided a first-class cheesemaker, and they would see that he got sufficient wages to stay there when he made a reputation for the factory. There is not a factory in this county but might increase the value of its product by building up a reputation for its cheese. You may not do it in any one or two years, it requires time to establish a good reputation on the markets of Great Britain. Begin at the fountain head, and have the producer of milk realize that he is interested in this

thing right from the start to the finish. I look forward to the day when the milk producers in Canada will study this question more, and become more familiar with all the conditions which affect the value of their products. We do not want any inferior cheese made, even though someone does make up the difference in the price. I believe that the present system of instruction and inspection has had some effect in that direction because it is causing people to talk more about these things. (Applause.)

Mr. G. G. Publow, Chief Instructor: I would like to take this opportunity of pressing home some of the truths that have been given to the people during this convention. It is a great pleasure to me to be able to say that this has been the best dairy convention that we have ever held. I think the information that has been given here has been the best I have ever heard. What is the object of all this work we have been doing? Is it not to insure a good strong demand for the goods we have to offer. There should be the greatest sympathy between the producer and the cheesemaker. Never in the history of the work, since I have been engaged with it, has there been such a disposition shown by the people to meet on fair grounds the buyers and manufacturers that there has been this year. Never in the history of the trade have the farmers of this country shown a disposition to pay a fairer price to the laborer. I appeal to the cheesemakers of this country, and the factory men of this country, to draw your patrons closer to you. I hope to see the day when the cheese factories of this country will be centres of dairy education, and no man is in a better position to give his patrons the desired information than the cheesemaker. An effort is being made by the Department of Agriculture to send a speaker to all annual meetings of factories. We are endeavoring to have the instructors go there. The cheesemakers know what means are necessary, and I would say do not depend entirely upon the Government man. If there is a man amongst yourselves whom you know does well, why not take instructions from him. Meet together in your factories, if you are having any trouble, and your cheesemaker should be able to point out what man is sending the milk in in excellent condition; ask that man how he does it, and do not be afraid to imitate him. You pool your milk together, looking for the same returns. Owing to the conditions in the manufacturing of cheese, one man's milk may cause a loss of several hundred dollars. It is a mutual business, and every man is a factor in causing a loss. He should be in a better condition than the man who is handling it every day; you must get closer to him.

The laws of this country are very strict regarding the production of milk and place of manufacture, and the eyes of the people of this country are directed towards us, and they are expecting that we will see that the proper conditions exist in these places. I think it is well that the cheesemaker in every factory should make an effort to educate his people as to what is necessary to do. It is likely we will have to tighten the lines. There is no law that will compel a man to send his milk. Supposing I say to a man, "If you do not send your milk in a better condition we will have to prosecute you." He might say, "Well, I will not send any more milk." If there is a patron in your factory who falls away because he has been pressed to send milk in better condition, hold him for the price of manufacture. I think that is only fair to yourself, and it is likely we will have to press them if they hold out as they did last year, and it is well for you to understand that nothing has been asked, or will be asked, other than common decency. What we are asking for is clean, sweet, wholesome milk, clean utensils, and a place where it is manufactured kept in clean sanitary condition. Never in the history of the manufacture of dairy products in Eastern Ontario has the

effort been put forth to have these places clean that there will be in 1908. (Applause.) I want the conditions surrounding the manufacturer of dairy products such that I can take any man from any country with pride and pleasure to see it. I do not care how cheaply they are constructed so long as they are clean. I appeal to the people of this country to see that the dairy buildings are built of the best building material. Our first-class makers are not being over-paid, but some of our makers are getting three times more than what they are worth. Less than twenty-five per cent. of the cheesemakers in the Province of Ontario are qualified to test milk, and make the very best cheese. Never will we get up to where we should, until we have these matters improved. Every man should be an expert. We must reach perfection if we are to get the highest prices.

Mr. Barr: A real bright young fellow said to me, "I would like to go to Kingston School this winter, but I have been at this factory for years and this has been one of the hardest years I have had. I have a wife and two children, and I have either got to go to the river or to the woods this winter in order to make money to keep my wife and children." Whose fault was that? I believe there are lots of cheesemakers in Eastern Ontario that have not money to go to Kingston. I am not saying it is the farmer's fault, but it is a condition that exists to-day in the dairy business. During the past season there was no section in Ontario or Quebec that stood up in the lime light in the trade in Montreal like Prince Edward County; because you have made such improvements in your curing-rooms. The trade was looking at Prince Edward County with very critical eyes, and if any cheese came from this county that was not quite up to the mark they were very severely criticised. You see what you got by getting up on top; if you are going to keep the reputation, you have got, you will have to keep forging ahead. There should be no excuses for not having ice on every farm in Prince Edward County. I had charge of the instruction work in Western Ontario for some years, and I thought I had a hard proposition in the West; but since I have come down to the East I want to tell you candidly, that I think I had a considerable snap to what Mr. Publow has in Eastern Ontario.

The Convention was then declared adjourned.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

ANNUAL MEETING.

The forty-first annual meeting of the Dairymen's Association of Western Ontario was held in the Opera House, Woodstock, on Wednesday and Thursday, January 15th and 16th, 1908.

There was a very large attendance at the meetings, showing that a deep interest is being taken in the dairying business in Western Ontario. As usual in connection with the annual meeting of the Association, a Dairy Exhibition was held, and for this purpose the commodious Market Building was used. There was a splendid exhibition of dairy products.

PRESIDENT'S ADDRESS.

By John McQuaker, Owen Sound.

As president of the Association, I am not going to harangue you with an address of considerable length this morning. I have incorporated what I have to say in the Directors' Report, which I shall read to you. I am to be pardoned, I think, if I express to you my appreciation of the honor you did me a year ago, in electing me as President for the year 1907. It is an honor to be President of an Association such as this, which stands for the advancement of the dairy industry of Western Ontario. I am also to be pardoned I think, for a word of appreciation of the position I hold, as presiding at the convention in the good city of Woodstock. The people of this district will readily grant that this is the very centre of the dairy industry of the Province of Ontario. There are other parties who would like to claim the supremacy, however, but it is not my intention to raise any discussion as to the merits or demerits of any particular section of the country as regards this industry.

I shall now be pleased to read to you the report of the Directors for the year 1907.

DIRECTORS' REPORT.

Permit us to welcome you cordially to-day to the forty-first Annual Convention of the Western Dairymen's Association, and to express the hope that you may not only be benefitted by the addresses and discussions of the several sessions, but that you may go home with a fresh enthusiasm to make the dairy industry the prominent one in the agriculture of Ontario. It is a source of general satisfaction that the Convention is being entertained by the good city of Woodstock in the very heart of one of the best dairying districts of Western Ontario. It is now some six years since the Convention met here, and it will be very interesting to review the progress of the dairy industry during these years, so that we may avoid the mistakes we have made in the past, and plan for larger and better things for the future.

A careful examination of the program which is now in your hands will, I think, convince everyone that every minute of the two days of this Convention will be full of good things for the interested cheese and butter men of the Association. We ask that you give your undivided attention to the men who have come to address you, and that you each do your part to make the Convention a complete success.

Your Directors wish here to place on record their regret at the resignation of Mr. George H. Barr, who for a number of years so ably filled the position of Secretary-Treasurer and Chief Instructor of the Western Dairymen's Association. We are, however, pleased with the promotion which has come to Mr. Barr. Your Board were extremely fortunate in having on our staff of instructors a man, well qualified to take up and carry on the work in a most satisfactory manner—Mr. Frank Herns—who, on the recommendation of your Board, was appointed by the Department of Agriculture to the position.

We are pleased to be able to call the attention of the members of this Association to the fact that the experience of the past season has been most encouraging to the patrons of the cheese factories and creameries, high prices prevailing. A steady progress is being made in the quality and finish of our cheese, and improvement is also shown in the quality of creamery butter in Western Ontario. A great percentage of our butter has been consumed at home this year. A large amount of money is being spent in improvements of cheese factories and creameries, their equipment, and surroundings, under the improved system of instruction and sanitary inspection, which the Association has been endeavoring to carry out with the support of the Department of Agriculture. During the past season the work of instruction in the factories and creameries has been continued with some changes. Every factory or creamery has been visited at least once, and almost all have had from four to six visits by the instructors. A full report of the instruction work will be submitted during the Convention. The charge formerly made for this work was withdrawn, the entire cost being borne by the Department in Toronto. We desire to express our appreciation of the interest of the Hon. Minister of Agriculture and his staff in the welfare of the dairying industry of Ontario, and to acknowledge the substantial financial assistance which the Government continues to give to the Association.

There have been spent this year in Western Ontario in factory improvements $35,882 on cheese factories, and $16,954 on creameries. Further particulars regarding the work of instruction will be found in the Chief Instructor's Report, which will be submitted to this Convention a little later.

Prospects for the future of the dairy business in Canada are very bright, and so long as we can furnish cheese and butter of satisfactory quality our dairy goods will continue to hold an important place in the markets of Great Britain. Your Directors have recognized the cheese and butter exhibits held in connection with the annual convention of this Association as one of its prominent educative features, and it is gratifying to note the interest manifested by the members in this competition.

In connection with this exhibit this year, instead of having a scoring contest, it was thought that perhaps better educative results might be obtained if one or more cheese were purchase by the Association and these cheese allowed to be examined by anyone who wished, and scored if desired. Thus everyone will have the chance to compare notes with the judges so far as these cheese are concerned.

There were three full Board meetings and six Executive meetings held during the year. A special officer was appointed by your Association to deal

with cases of milk adulteration. This system has worked out very well and bids fair to materially discourage the growing tendency to deliver deteriorated milk at our cheese factories. A number of convictions have resulted, and we hope to have this feature of our work continued and the law so rigidly enforced that the dishonest man who tampers with the milk he supplies to the factory, thereby doing himself a wrong, as well as his fellow patron, may find it the wiser policy to do the right thing all round.

A committee was appointed by your directors to meet a Committee from the Eastern Association to consider the advisability of revising the dairy laws, particularly that portion relating to fines for delivering deteriorated milk. These fines were recommended to be raised. It is almost certain that the matter will be dealt with at the next session of the Legislature.

In conclusion, will you permit us to urge upon every member in attendance at this convention the educational value of this annual gathering, and to impress you with the wisdom of making the most of the opportunity for mutual advancement in dairy knowledge.

The convention ought to be an inspiration to us all for the future if we will only apply ourselves seriously to it. We need and ought to have all the enthusiasm we can gather to meet and help to overcome the difficulties which every dairyman is certain to encounter. We trust the year upon which we have just entered may be a very prosperous one to those engaged in dairying in this Dominion.

ADDRESSES OF WELCOME.

Mayor Sawtell: I am sure when the Association chose Woodstock for their Convention point, they did a wise thing. I do not think there is any convention that could be held in Woodstock that would be more interesting than the Dairy Association, because our farmers are very much interested in dairying, and I know they will be interested in this Convention. We are glad that you are here, and I would say on behalf of the city and surrounding country, that we welcome you to our city.

Mr. Gray, President of the Board of Trade: The Mayor has spoken words of welcome on behalf of the 10,000 citizens of Woodstock, but it is my privilege to welcome you in the name of the business interests of the city.

A short time ago the Board of Trade made a census of the factories of the city and found that we have some 55 factories, employing some 1,200 men. We hope it will not be long before you come back again. We welcome you heartily.

Replies to the address of welcome were made as follows:

The President: On behalf of the dairymen of western Ontario I would say that we fully appreciate the hearty welcome which representatives of the good people of Woodstock have just tendered to us. I feel sure that the heartiness of our welcome to this good city of Woodstock will make us all feel extremely at home, even in the winter.

It is now my pleasure to call upon one who is quite well known to some of you. Oxford claims him as her son. He is an old Ingersoll boy, who has risen to prominence in connection with your dairy work. I refer to the Dairy Commissioner for Canada, Mr. J. A. Ruddick, who will speak to us on some phases of dairying abroad, illustrating his talk by lantern slides.

DAIRYING ABROAD.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

It is always a pleasure to me to come back to the County of Oxford, and meet my old friends and acquaintances. I have travelled a good deal from one place to another since I left my home near Ingersoll nearly thirty years ago, and I never found it any disadvantage to me wherever I have been to be known as an Oxford boy.

I am going to tell you to-night of some of the things which I have seen in other countries where they compete with us in supplying Great Britain with butter and cheese. It is always a wise thing for any people engaged in any line of work or any particular trade to know what their competitors are doing, and I shall endeavor in as brief a way as possible to show you how, in some ways at least, our competitors are doing things, and there may be some inspiration and some instruction for us in this connection.

We cannot go abroad and copy everything we see blindly; we have to study our position. There are many lessons which can be learned by the Canadian dairy farmer and the Canadian cheese and butter maker from those engaged in this work in other lands.

Mr. Ruddick then favored the audience with a number of lantern views, and an address which was very interesting, showing the methods of making and shipping cheese and butter in different parts of the world, which was listened to with rapt attention by the large audience present.

ADDRESS.

By Donald Sutherland, M.P.P., Ingersoll.

I can assure you that I feel highly honored indeed to be asked to address a gathering of the dairymen of Western Ontario. I do not know of any better place for holding your Association meetings than right here in the centre of this County of Oxford, which is recognized as being the home of the dairy industry.

In looking over the official programme, I notice that back in 1868 the Association was formed, and for several years the President of this Association was a resident of the town of Ingersoll, and for many years the President of this Association was a resident of South Oxford.

I can speak to you as a practical farmer. You have been listening to practical men address you this afternoon and this evening, and the instruction they have given has been very great indeed.

The history of this industry is familiar to everyone present here to-night. The success attending your efforts has, in no small measure, been due to co-operation, and that is something that I think should engage the farmers of this country at the present time a little more than it does. We find that at the present time, we are surrounded by the most perfectly organized bodies it is possible to conceive of. The farmers of this country are the only class that are not organized to further their interests, and I think it is time that we were beginning to realize the importance of organization. I certainly do not find fault with any class or body for organizing: union is strength, and that being the case with every other class, the time has come when it must engage the attention of the farmers more than it has done in the past.

Dairying is recognized as the most profitable branch of agriculture. We have reached the time in the history of our country that is fraught with great things for this Province: yes, and for this Dominion. The old pioneer stage has been passed; the country is stripped of its rich wealth of timber that was the growth of centuries. We have got to adopt different methods from those pursued by our fathers. We have to follow some scientific methods. The men who came out here and did the pioneer work, those old empire builders who made the broad acres and cleared the farms, have passed away, and in hundreds of cases there is not now one of their descendants occupying the farms that they cleared with so much labor, and that is an unfortunate thing. I believe there is not enough sentiment connected with the youth of our country. The young men and women have gone into the cities to more congenial occupations, as they think, but I cannot conceive of any occupation that is a more desirable one than that of agriculture. I am satisfied, however, that we are not receiving fair remuneration for our labor.

I would like to refer to the pioneer work in the dairy industry that was done by the late Mr. Tillson of Tillsonburg. We have the records that were kept of the individual work of the cows in the herds, and I have taken the trouble to find some of the results obtained by Mr. Tillson of that herd he had in Tillsonburg.

You have had an excellent address on the growing of alfalfa. I saw alfalfa growing on his farm that was certainly a revelation to me. This was years ago, and he had it growing to perfection.

In 1898 Mr. Tillson had in his herd 55 cows. What do you suppose the average of that herd was in that year? 10,242 pounds per cow; the next year, 1899, it ran up to 10,933 pounds per cow; and one year he had a cow that produced as much as 20,132 pounds; and in four years the production of that one cow was 37 tons. I have not taken as much interest in dairying as a great many of you have, but I question whether this has ever been surpassed. I know he devoted years to the building up of the herd, and he had a herd that was a credit to him. And the pioneer work that was done by Mr. Tillson in Oxford should not be lost sight of. We should give such people all the credit to which they are entitled; they are doing a good valuable work. There is no man who can engage in business of that kind, and conduct it successfully, without having a great benefit upon his neighbors and upon the whole community, and I say all honor to those men who set such an example before the youth of the country.

ADDRESS.

By M. S. Schell, M.P., Woodstock.

I am sure it affords me a great deal of pleasure to be with you this evening. I came up from Ottawa on purpose that I might take part in your proceedings, and show my appreciation of the work that is being done by the Western Dairymen's Association. There is no Association that has accomplished so much good, or has done so much for the development and progress of Canadian agriculture and for the advancement of the material interests of our country, as has been done by the dairymen of both eastern and Western Ontario.

You have heard that the first Canadian Dairy Convention was held some 40 years ago, and as we contemplate what has been accomplished and the progress that has been made, we begin to appreciate the importance of this industry.

In 1868, when the first convention was held, the exports of cheese were $550,000; in 1880, they climbed up to $3,800,000; in 1890, $9,312,000; in 1900, we reached the magnificent sum of $19,856,000; in 1903, the increase was still marked, $24,712,000.

I am sure that 1903 has been the banner year in milk production; the largest flow of milk was realized during that year. In 1904, the receipts were nearly as much, but the prices being better, the money returns were $24,000,000; in 1905 there was quite a reduction, and the receipts were only $20,300,000; in 1906, the receipts were $24,433,000; in 1907, that is the year ending the 31st of last March, the receipts were $22,006,584; and this last year the exports are going to be lower than for a number of years. So far as the reports are to hand the exports of cheese would amount to about $20,000,000.

In 1895, the value of the export of butter was $694,000; in 1905, $5,122,156; in 1906, $7,075,539; in 1907, $4,011,609; and this year the exports of butter will be very low indeed.

It is well for us at a gathering of this kind to see whether there may not be some lessons for us from the experience of this past year. We want to profit, if possible, by our experience. We had a very late spring, the growth of pasture was late, and not very good; the summer was exceptionally dry, the fall was not as good as many falls. I think it behooves us, as farmers, to try, if possible, and see if we cannot provide so that when the pasture is not as good as it might be we will still have fodder for our cattle. I know from experience that ensilage will give as good results in winter feeding as in summer, and I believe that every farmer who goes into the dairy business should make it a point to have a well-constructed silo. It does not pay to allow your cows to go out on grass in a weakened condition. Invariably in this country, we have a shortage of pasture during July and August, and on into September. In 1895 we only exported some 500,000 pounds of butter. In 1900 we exported $3,000,000 or $4,000,000, and in 1903, $15,000,000 worth.

Taking these two industries of butter and cheese, the total exports amounted to the sum of $48,000,000; and then, in taking into account what we use in our homes, which would represent at least $50,000,000 more, we may say that this industry represents a money value to the people of this country of at least $100,000,000, and is one of the greatest sources of wealth we have in the whole Dominion. The two million cows that we have in the Dominion of Canada could be made to produce a good deal more than they do. The 1,152,000 cows we have in Ontario could be made to produce five or ten times more per head than they are doing. We heard a good deal about weeding out the poor cows that only give from two to three thousand pounds of milk. I believe the cow is being abused. There are a great many poor cows, but I can tell you there are more poor feeders. We must make the best of what we have, and if we would give more attention to the question of feeding, we would get great deal better results.

If we put the same amount of energy into our business as farmers the whole year round, we will attain a much higher position, and I would say to the cheese-makers, "Put your life and energy into your work." It is only according to the amount of soul and spirit and life and ambition and energy, coupled with intelligence and skill, that you will make a success in your calling.

Do not be satisfied with getting just what will pay; aim at being the best cheese-maker in the country. If you are giving good pay to the cheese-maker, and he does not make a good article, then make him get out of the business. We owe a duty to ourselves, and to the country at large; and if we are not true to ourselves we will fail in reaching that standard of excellence which is incumbent upon every man who goes into this business.

I thank you for the kind hearing you have given me, and I hope this convention will prove the best convention ever held in County of Oxford, and I hope you will get inspiration and ideas that you will go home and put into practice.

The PRESIDENT: I said this afternoon that the man behind the gun in connection with the dairy industry is the farmer, and that is true; but in connection with the work of the Association in carrying on the instruction and in the supervision of the instruction, and general work of the Dairymen's Association throughout the Province we are depending upon another source for the revenue that is necessary to carry on that work.

We have with us to-night the Minister of Agriculture for the Province of Ontario, who has been exceedingly good to the Dairymen's Association since he has taken office. He is a man who takes deep interest in agriculture. He is a practical agriculturist himself, and he will now speak to us. The Minister usually has something very definite to map out in the way of work for the future, and I have no doubt he has thought out carefully what his plans are for the future. I am not in a position to indicate what direction his address will take, but have much pleasure in introducing to you the Honorable Nelson Monteith.

ADDRESS.

By HON. NELSON MONTEITH, MINISTER OF AGRICULTURE, TORONTO.

I can assure you that it is with a great deal of pleasure I find myself among the dairymen of Western Ontario, especially as it is our good fortune to meet in this good city of Woodstock, known as one of the industrial centres of this great Province: a city also that may well consider itself situated in the fruitful section of this old county of Oxford, which is a county that has, from an agricultural standpoint, a great claim upon the agriculturists of this Province. It has been the pioneer, I believe, in the introduction of dairying as we know it to-day. Not only that, but she has exemplified the value of dairying in maintaining a density of population in our rural area.

It is not my purpose to-night to speak to any great length, as it would be unkind of me should I inflict a long speech upon you. Therefore, since it is my good fortune to meet with you again, I desire to express the satisfaction I personally feel in the good work that has been accomplished along dairy lines during the past year by this Association. We are, as yet, somewhat in the experimental stage, and I suppose as long as we continue in this industry, requiring so much skill, we shall be in the experimental stage. There is much to learn, and I believe we are a people capable of learning much. A year ago, when I met with you, it was felt that something should be attempted in a more thorough instruction of the cheese-makers of this Province of Ontario. While the standard of excellence was admittedly high, it was still felt that we had not reached that high point of excellence that will permit of no further advance. It was felt that the quality of our

goods produced might be improved, and one of the means whereby that improvement might take place was felt to be not only in more uniform instruction, but in inspection as well. But having an instinct of the feeling of the public, I felt that there was a possibility that some of the inspection might over-step the points of prudence. Judging from my own make-up, that it is far easier to lead than to drive, I felt possibly that this might be taken as an effort to drive the cheese-industry of the Province rather than to lead it. After talking over the situation with those identified with the industry, east and west, it was felt that in the best interests of this great industry—which, after all, is the great right arm of agriculture in Ontario—that an effort should be made to at least give a more thorough inspection and instruction, and we undertook to legislate with that in view, as will be seen by the legislation of the past session. Now, this legislation has met, I believe, with a reasonable degree of success; and to-day although we have had the conditions that make for a poor product during the past year, the general consensus of opinion from Montreal, our great port of shipment, is that during the past year the cheese product of this Province has been excellent, which is a great tribute to the makers and the methods they have followed during the past year, and the instruction they have received. (Applause.).

I believe we are safe in giving reasonable encouragement and support along dairy educational lines. It may surprise many of you who have given the matter but little thought, as to the vast sums that are being expended annually in urging better instruction and information along dairy lines in the maintenance of our schools for the teaching of our instructors. A considerable sum of money is expended for paying outright the men who visit the factories from time to time, and helping the makers to grapple with your difficulties, and see that the product from the farm is good, and that the maker has a fair show in the matter in getting a good quality of milk for the manufacturing.

The sum expended on these various lines in the Province of Ontario in the past year was in the neighbourhood of $66,000. This was a large sum, but I believe the money was well spent, and will justify the expenditure; and for that reason, and having the responsibility of standing between you and the people in this regard, I feel that you have upheld my hands and given value for the money expended. (Applause.) I say this by way of appreciation of the work of the instructors, and of those engaged in the varied lines of the dairy industry; because we are all a great corporation in this business, as we are in every other business, almost, in the country that touches agriculture. "No man liveth unto himself," and the man who produces the poor article, just so much lowers the standard of that high and noble calling, "agriculture." Therefore I say each one of us should aim and strive to maintain as far as in us lies the high reputation that we hold at the present time.

I believe it will be necessary in the near future—in the coming year—to still tighten the work of inspection and strengthen the lines of instruction so that we can go on to greater things in the future than in the past.

The other gentlemen who have spoken, Mr. Schell and Mr. Sutherland, have touched upon many lines upon which it is unnecessary for me to speak; but what we want in this business is the ability to produce cheaply and of a good quality, and to make a greater profit. I think I can safely say, in view of the high wages being paid, that higher prices are bound to rule for food products, and that should be an encouragement to us to see to it that we are there to profit by this higher range of prices. It is not possible for our people to crowd so largely to the urban centres without bringing

about such a result. The higher range of prices will tend to bring the people back to the land, which, after all, makes for stability in our community and our country at large.

It was my privilege during the past year to visit the Mother Land, and to look into as much as a hurried visit would admit, their intensive methods of cultivation. I feel that in connection with this great calling of agriculture as time goes on, and our centres become more populous, we should be called upon to produce a greater variety of products for the maintenance of the wholesome, strong artisan class in this Province of Ontario. I went abroad with the expectation of finding much that would be of value to me in connection with the work of the Department, and I found in many portions of the old land, and on the Continent, some conditions that we might well copy. But, upon the whole, I find that agriculture is on as high a plane in regard to the skill put into it in this country as any place I visited. True, they are making their acreage yield more than we are in many districts in the old land, but for implements and other utensils with which we work, I find that the better class of farmers in this country are thoroughly up-to-date. They have possibly overdone it in the matter of "spreading themselves," as the saying goes—spreading themselves over a large number of acres—and I believe many of us would find greater profit in cultivating more intensely along the line suggested by Mr. Schell, and in the growing of fodder crops in a more intensive way. True, that would mean a change of our methods, and the employment of more labor, but I believe these are conditions which must come if we are to meet the necessity for intensive cultivation.

I trust the time is not far distant when the homes in this Province of Ontario will be a duplicate of the best conditions that it is possible to have; that we shall in our country homes have the privileges of the daily press, have our telephone system, and I believe you are largely developing it in this county of Oxford. With cheap power, we will have numerous radial railways to carry our products to the most distant of our Provincial markets, and when these conditions come about then our people, even though they have reached the high standard of citizenship at the present, will be more ready to dwell in the homes of their fathers. I trust that time is not far distant.

I wish to express, as a humble member of the Government, the appreciation we feel in connection with the good work carried on, not only by the staff employed, but also by the people in whose charge they have largely been put. Unless the producer values his responsibility, and acts up to the highest standard, the work of the instructors will be largely lost. It is true, not only of the men upon the farm, but of the women upon the farm, and I think it is unnecessary for me to make any remarks as to the necessity for cleanliness on the farm, because I believe the women of Ontario equal any other women in the world in this regard.

In order that everything in connection with this industry may be wholesome and sweet, so that our products may go abroad and meet with an ever-increasing consumption in the old land, it is necessary that we should exercise the greatest degree of cleanliness.

It is strange indeed to find that at the present time there are 150,000 less boxes in store in Montreal—150,000 less boxes on the English market of our cheese than a year ago—and these are the things that indicate that we are bound to have increased prices for our products in the coming year.

I wish you success, and I trust that those of you—and you are highly favored in this section—who have the opportunity will largely augment your herds and increase the product, and keep the standard up to the high level of the present and then a higher level in the future.

I thank you for giving me the privilege of again meeting with the men engaged in this business. I have nothing further to say than to pay a tribute to the ladies who have graced our gathering to-night. No business is going to flourish to its greatest extent without the friendship and interest of the fair sex. It stimulates us men to higher and nobler efforts when we feel that the women of the country, the best in the land, are looking approvingly upon our efforts. (Applause.)

The CHAIRMAN: I am sure it is a privilege for us to hear from the Minister words of appreciation to the way in which we have demonstrated the legislation which the Provincial Legislature passed last session. I am glad the Minister feels that at least good progress has been made, and satisfactory work has been done.

REPORT OF DAIRY HERD COMPETITION.

The secretary, Mr. FRANK HERNS, read the following report:

The Directors decided to again take advantage of the liberal donation of Messrs. Ryrie Bros., of Toronto, of a silver and bronze medal for Dairy Herd competition. The regulations were the same as last year except that instead of the medals being offered for the most money per cow, they were offered to the patron furnishing the most milk per cow to a cheese factory, and the most butter fat per cow at a creamery from April 1st to Oct. 31st, 1907, not less than eight cows in the herd, and the figures to be taken from the factory books and certified to by the secretary and maker.

No patrons of a creamery entered, therefore, the bronze medal was awarded to the patron sending the second highest amount of milk per cow to a cheese factory. Only eight patrons of cheese factories entered.

The silver medal was won by Mr. W. E. Thompson, of Woodstock, with an average amount of milk per cow of 8,020 lbs., and the bronze medal was won by Mr. Wm. Pearce, of Holbrook, with an average amount of milk per cow of 7,571½ lbs.

The following is a tabulated statement of the herds:

Owner of Herd.	No. of acres in farm.	Breed of cows.	No. of cows in herd.	Total lbs. of milk sent to factory.	Average lbs. of milk per cow.	Total money received	Average amount of money per cow.
						$ c.	$ c.
W. E. Thomson, Woodstock.....	150	Holstein and Holstein grades	12	96,240	8,020	934 64	77 89
Wm. Pearce, Holbrook.....	50	Grade Holstein....	8	60,572	7,572	585 02	73 13
Mason Bros., Tyrrell	280	Grade Holstein....	21	156,986	7,475	1,375 93	65 52
S. Cuthbert, Sweaburg.....	75	Grade Holstein....	15	102,161	6,810	967 14	67 47
M. Swance, Springford.....	125	Holstein and Durham	12	79,380	6,615	730 63	60 89
J. W. Cornish, Harrietsville	50	8 Grade Holstein. 1 Grade Ayrshire 1 Grade Durham and Holstein....	10	64,321	6,432	606 75	60 67
R. Gleason, Medina..	150	Grade Holstein....	24	133,408	5,559	1,314 64	54 77
R. S. Ballantyne, A'wood.....	.....	.....	21	188,878	5,661	.....	.....

DEVELOPING A PRIZE MILKING HERD.

By W. E. Thompson, Woodstock.

As I am the recipient of the prize given to the patron of any cheese factory sending the most milk per cow during a period of seven months, I have been called upon to give a short address.

Five years ago I started business for myself on the old homestead, known as "Leslie Farm," in the township of East Zorra. Being a man with limited means I had to start on a small scale, and grow as my profits permitted. I bought all the grade Holstein cows my father had, and three more at sales, making nine in all, which had made a reputation for themselves at the Innerkip factory, and which, as you see, has not been lost.

I have always used a pure-bred Holstein as a sire, raising only heifers from the best cows, and feeding them well while young. My herd is composed of five pure-bred Holstein cows and the balance good grades.

I have always taken a great interest in the questions pertaining to dairying, and attribute much of my success to the knowledge obtained from attending the Dairymen's Conventions and reading the different farm papers, and any information obtainable along dairy lines.

Dairymen of To-day. A man to be a successful dairyman of to-day must of necessity have a fair education, and I know of no better place to get such an education than at the Ontario Agricultural College. I regret very much not having been able to take a course along dairy lines in my younger days, as it would be very useful to me in my business.

Bookkeeping is very necessary on the farm to-day. A man should be able to tell at the end of the year where his greatest losses and profits have occurred, thus putting him in a better position for the next year's business. There are many minor points about dairying, such as testing the cows, paying for milk by butter fat, sterilizing the whey, use of separators, and how to ascertain the proportion of casein in milk, etc., all of which are of great importance to the farmer who is alive to his business.

One thing important in successful dairying is a good, comfortable, well lighted stable, as the cows are very sensitive to heat or sudden cold. My stables have stone foundations with plastered walls and cement floors, with plenty of light and fresh air. There is a complete water system throughout the stable, each pair of cattle having a basin to drink from, which is kept filled, being regulated by a float in the water box.

Good Cows and How to Get Them. Most of my present herd are young, and of our own raising, some of which trace back to my boyhood days. I am in a position to say that the very best cows I have were heifers raised from heavy milking dams. By using a pure-bred sire of a diary strain, and of a long line of heavy producing ancestry, what more can a man expect than to improve the herd, if the proper care and feed are given.

Last year a two-year old heifer gave 7,106 pounds of milk, testing 3.7 per cent. of fat, and a three year old gave 10,326 pounds of milk testing 3.6 per cent of fat, under ordinary care and feed. Another cow, twelve years old, gave 14,155 pounds of milk testing 3.8 per cent. of fat, and is still milking.

At our factory the milk is paid for according to test, which is the only way up to date, of receiving milk, and my average test for the seven months was 3.5 per cent. of fat.

I have been trying for the last three years to so weed out all my poor cows in order to get a herd of equal value, but it is only this past season that

I have been able to know the real value of each cow. Last spring I joined a Cow Testing Association at Spring Creek, which I feel assured will be a benefit to any dairy farmer. With a little time and care you may know just what each cow gives in milk and fat. A person must be careful to get the exact weight of each milking, and to take a proper sample, or all his time and trouble is of no avail.

The question of keeping records of cows is engaging widespread attention. No one can claim to be an up-to-date dairyman who does not keep individual records of his herd. No matter how well cows may be cared for there will be an improvement just as soon as a proper system of keeping records is adopted, and a new and increasing interest is created. The owner sees, as he never did previously, the wonderful capabilities of his good cows and the uselessness of his poor ones. He sees how responsive his cows are to the smallest influence, and delights in studying their individual characteristics, and once started he does not want to go back to his former methods. I would like to see more of our Zorra dairy farmers join in this very important work. We have a straight spring balance hung behind the cows, and it takes only a few seconds for each milker to hang his pail thereon and mark the amount on a sheet. Samples are taken three days each month, morning and evening. At the end of each month the box and sheet are taken to the factory and tested by a capable man sent for the purpose. Again we find that the milkers take renewed interest in the work. They milk cleaner, trying to get as much or more milk each successive milking, and are more careful as to the feeding and handling of the herd.

My herd numbers in all twenty-eight head, ten pure-bred Holsteins, and the balance Holstein grades. The largest number milked at any one time during the year was fourteen, including a two-year old heifer whose milk was used for family purposes. During the seven months of the contest I sent on an average the milk from twelve cows, which gave a total of 96,240 pounds of milk testing 3.5 per cent. of fat, making an average of 8,020 pounds per cow. Two of these cows freshened in October, 1906, two in January, 1907, five in March, and the balance in April and May. The total pounds of milk given by the fourteen cows for the whole season was 142,418, making an average of 10,172 pounds of milk per cow.

Method of Feeding. This is my method of feeding in winter: In the morning the first thing we do is to milk the cows; then the roots and meal are fed, after which the straw or hay. The water is always before them. At noon we give a feed of cut corn, in the evening, say five or half past, we again milk, and the roots and meal are again fed followed by straw or chaff. This diet is continued until about the first of March, when hay is fed in place of straw. The meal consists usually of a mixture of barley and oats. When necessary to supplement this, some bran is added, together with something stronger, such as low grade flour or ground wheat, which brings the mixture to about the same weight as the barley and oats. The milking cows receive of this about a gallon each, twice a day. I find that even yet my cows are not fed to their full capacity, as when given a feed of meal at noon it makes a considerable increase in the amount of milk. Cows give a greater return when freshened in the months of December, January, and February, and if well fed they will give nearly as much milk during the summer as those which freshen in April or May.

In the summer the cows are tied in the stable for milking, and if the flies are on them they are sprayed with a preparation put up by Dr. Williams. When the pasture is beginning to get dry and short we give one quart of meal

or two quarts of wheat bran twice daily until green feed such as corn or roots may be used.

Q.—Did you feed corn ensilage?

A.—I feed cut corn. I have no silo; I wish I had.

Q.—Do you consider it would pay to feed wheat bran at present prices?

A.—Yes, I do; you get your value out of the bran in more ways than one.

Q.—That is, provided it is not adulterated at all?

A.—I cannot say that I have had any adulterated bran, so that I have had no experience.

A MEMBER: The country is full of it.

Q.—Do I understand the speaker to say that he had only fourteen cows milking during the entire year?

A.—Yes.

Q.—Had you more than fourteen cows in the herd?

A.—I had not more than fourteen cows, the balance are young cattle. I have had as high as twenty.

Q.—How large is your farm?

A.—100 acres.

Q.—I thought you said you had 23 head of cattle?

A.—I have at present.

Q.—There were only twelve cows milking during the seven months?

A.—Yes.

A MEMBER: How about the other two?

A.—Just there I might explain that matter. In the month of April I milked nine, in the month of May eleven, in the month of June thirteen, July thirteen, August thirteen, September thirteen, October twelve.

A MEMBER: Did the same cows go on milking, or when one dropped off, you put another in its place?

A.—No, the same twelve.

Q.—You did not get this average from the same twelve cows, you had more than twelve cows?

Q.—You had less than twelve cows milking during the period?

A.—If you add up these figures it makes twelve cows.

Q.—Part of the season you were milking only nine cows?

A.—Yes.

Q.—That milk was from fourteen different cows?

A.—No.

Q. The same twelve cows gave it all?

A.—I claim I have fourteen cows in the herd. I had a two-year old heifer besides.

A MEMBER: Is that the way the competition was carried on? You strike an average. I always considered you had to have so many to start with, and finish up with the same cows?

A.—I do not know about that, I am sure. If it would make it any clearer to you, I have this list here, just what each cow furnished.

A MEMBER: It appears to me from the question, that you had one cow for a month or two, and then let her dry up, and commenced with another cow.

A.—That was not the case. I started with nine, and for four months there were thirteen milking without one dropping off.

A MEMBER: You averaged the thirteen cows to balance up the nine, and called it twelve cows?

A.—Yes.

NOTES ON COW TESTING ASSOCIATIONS FOR 1907.

By Chas. F. Whitley, Dairy Division, Ottawa.

There was a marked increase in the work during 1907, there being 52 associations instead of 16 in 1906, 876 members in place of 297, while the number of cows increased from 3,750 to 9,160. Better than the mere growth numerically is the enhanced interest taken by the members in the work. The weighing of the milk has been more regular, the samples seem to have been more carefully taken, and have been sent in more promptly for testing, while the work, generally speaking, has been continued longer, so that more records for longer periods are available than last year. Further than this, there has been a greater disposition evinced on the part of the members to meet the men doing the testing so as to ask questions on all manner of subjects pertaining to dairying. This is an indication of what could easily be accomplished with most beneficial results, namely, to make the cheese factory or creamery a real centre of dairy education. One or two associations further, at the suggestion of the Department, arranged for an occasional meeting of the members to discuss the records and take steps for the improvement of their herds. This feature is one of great promise as "in the multitude of counsellors there is wisdom."

Probably the greatest advantage of records of dairy cows is the opportunity afforded for comparisons. One is naturally led to enquire what is the difference in yields in various districts, in the yield of herds in the same associations, but most important between individual cows in the same herds under the same management. This brings into prominent thought the ultimate aim of the work undertaken by members of cow testing associations, namely, a study of the individual cow with the object of developing strains of animals producing abundant quantities of good milk economically.

Taking the *district* question first, it may be noted as an example of the contrasts brought to light that the total production of 54 cows in one association in Victoria County during October was 19,330 lbs. milk, containing 751.9 lbs. butter fat. During the same period 106 cows in Oxford County gave 65,830 lbs. milk, 2,347 lbs. fat, or a better yield by seventy per cent. Many men in the former association are looking for the dual purpose cow; probably all members of the latter association aim at special purpose cows. In the one district nearly all the farmers leave the whole care of the cows to the women of the house, and if they can make anything out of the cows besides keeping the house in milk, cream and butter, they are satisfied. Some keep a scrub bull running with the herd, and do not know when the cows should freshen. The other is a real whole-hearted progressive, money making dairy district. Taking other records from the same two counties it is found that in the six months, May to October, 1907, the total production per cow stands at 2,724 lbs. milk and 99.2 lbs. fat in the one case, and 4,793 lbs. milk, 165.3 lbs. fat in the other. This shows even a greater difference than during the comparison of one month, namely 76 per cent. One moment's thought will indicate the tremendous possibilities for Victoria County if the 19,000 cows were 76 per cent. higher in their returns, than they are at present. Why should they not be?

There is possibly a difference in the adaptability of the districts to dairying, but there is certainly a more pronounced difference between the individuality of the owners of the herds. One might consider the personality of the farmer, his particular interest in dairying, whether indeed he possesses the

prime requisite for success, a love for stock raising. Some are better adapted by nature for grain or fruit raising. A real affection for the dairy cow means better care of her, and consequently better returns financially.

Cows below the Average. Taking 8 months, April to November, 46 per cent. of all the cows recorded were 100 lbs. milk below the average every month. The average in May for all the cows tested in Ontario Associations was 764 lbs. milk, and 46 cows out of every 100 gave only 653 lbs. Similarly in August, the average yield was 638 lbs., and 46 per cent. gave only 529 lbs.

Taking the total number of milch cows in Ontario as 1,100,000, and then assuming that 46 per cent. of them could easily give 100 lbs. of milk *more* than they do at present, with milk at 90c per 100 lbs., the dairyman of this province could have *an extra income of three and a half million dollars.*

Please note this is by simply improving those *below the average*, which should not be difficult, and does not consider the immense possibilities involved in further improving the average of the good cows.

The differences between *herds in the same district* may now be considered for a moment; as they illustrate, possibly better than the above, the aptness and efficiency of one man's methods over another's in the application of intelligent, up-to-date business methods to the science and practice of dairying. In the dairy business to-day there is no room for shiftless, haphazard, "hit or miss" methods, the dairy herd has to be run as a commercial undertaking. Over and over again can be found instances of a small herd of ten cows producing just as much as twenty. Such contrasts are in herds in associations in Ontario, Quebec and British Columbia, indicating that there is room for little short of a perfect revolution in many localities. Let the records speak to the question for a moment. Nine cows in one herd give 265 lbs. fat, while in another herd in the same association eighteen cows give only 260 lbs. during one month. Again, 10 cows in one herd yield 9,550 lbs. milk, while 16 in another give only 7,000 lbs. This is a difference not of 76 per cent. but actually 118 per cent.

Touching the advantages of providing soiling crops, and the gain from feeding liberally, two herds in an association near Peterboro' afford a noteworthy contrast. One man who has fed chop all summer, chiefly oats and peas, obtained from his 7 cows an average yield for July August, September and October of 2,943 lbs. milk, 101.8 lbs. fat. A neighbor who this year, the first for many seasons, has not given any extra feed and says, "he is ashamed of his weights," get from his herd of 16 cows an average of only 2,230 lbs. milk, 78.7 lbs. fat. Had his cows been as productive as those in the other herd, he would have realized over 11,000 lbs. milk more than he did. With milk at 90c per hundred this would mean another $102 additional income in four months.

The next point of contrast is that between *cows in the same herd.* This individuality of animals is so strongly marked that only by diligent study and most careful observation can one hope to determine the most profitable cows for selection as the foundation stock of the herd. The very fact that in any breed there are so many departures from the characteristics and particular type that may be expected, the difference in the animals' ability to use feed, their variation in yield of milk and fat under similar conditions, their persistency in milking, all emphasize the tremendous importance of continuous investigation, unceasing and painstaking vigilance.

To illustrate some of these points, one does not usually expect to find a high fat content in Holstein milk. Here and there have been noticed this season some individuals of this breed testing over 4.0 per cent. fat. Are

there many more to be discovered? Why should we rest content with so many cows testing only 2.5, 2.2 and even 2? Is it fair to other patrons at the cheese factory to let the burden of making up the milk to a decent standard of quality as regards fat, rest on their better cows?

There is certainly virtue in inherited tendencies. The transmission of dairy quality is possible; judicious selection aims at this. Heavy milking ancestry is a very live factor in the capabilities of animals of the present generation. A twelve year old grade, calved October, 1907, gave in the eight months, January to October, 1907, over 8,360 lbs. milk testing 3.8 every month. She has had no special treatment, but comes of good milking stock. Selection pays. Blood will tell.

It has been stated that if the shrinkage per month in milk yield for the first six months is not over 10 per cent. of the previous month it is not abnormal. Very few indeed of the animals we have on record show as little as that. Some few go 13 to 16 per cent., but a very great many have a shrinkage of 20, 30 and even 35 per cent. There is certainly room for improvement at this point. One cow was noticed giving in three consecutive months 930, 434 and 238 lbs. milk. This is a shrinkage of 53 and 45 per cent. In one herd are found cows calving in spring giving only 500 lbs. milk in September, and others calving the same time that in September were still giving 900, 1,000 and 1,100. These are the animals to select and breed from.

The evident preference of the cow for methodical habits has been vigorously commented on by some of our members. Her objection to a change of milkers is very apparent. The establishment of a perfect sympathy and mutual understanding between "bossy" and the milker, and not only that, but the regularity as to the hour of milking is insisted on by our best men, who find that careful attention to these details pays, and pays well. Couple this attention with a study of the feed problem and we have an insight into the radically different returns from some herds in the Brockville association. During five months one lot of cows in the hands of a careful dairyman averaged 4,194 lbs. milk each, but another lot yielded only 2,727 lbs. each. If the earning capacity of the latter had been equal to that of the former they would have given 16,130 lbs. of milk more than they did in the five months.

In this age of fixing individual responsibility, the real student of cows seeks for those returning maximum profit. Taking it for granted that it costs about $30 to feed a cow, are we to take that as the total cost of maintenance? Surely there are other expenses. These may be classed as interest on the value of the cow: decline in value which charge provides for purchase of successor: interest and taxes on the necessary buildings, and cost of caring for the cow. The sire has to be maintained, the cost of which is offset by the value of the calves raised: and the manure should be credited. These charges will vary, but looking through some Ohio records it is found that $21 is taken as the average in dairy sections. Taking these figures as a basis for comparison and applying them to two cows in a Quebec herd, we arrive at this conclusion. A good cow producing 350 lbs. fat, and 7,900 lbs. skim milk, has a total value of product of $99.55. Less feed and these other expenses, the net profit is $48.55. An average cow in the same herd producing 205 lbs. fat, and 3,700 skim milk has a total value of product of $56.85. Deducting feed and the charge for other expenses, the net profit is but $5.85. On this footing one cow gives 8 3/10 times as much profit as the other. Now to obtain $1,000 net profit would necessitate only 20 of the one kind, but *171 cows* of the other kind.

The work of cow testing associations enables these forcible comparisons to be made, and is a powerful argument for their formation.

A MEMBER: Is this comparison always between two cows in the same herd?

Mr. WHITLEY: Yes.

A MEMBER: All fed alike?

A.—Yes, with just that slight difference, I intimated. That man is a particularly careful feeder, and he is always just crowding them. If he thinks one cow will do better with extra feed, he gives it. There would be a slight difference in the case of the feeding, but not very much.

Mr. J. A. RUDDICK: I want to say a word or two on this subject before we leave it. I am sure you have listened with pleasure and interest to what Mr. Whitley had to say in connection with the work we have been trying to do in the matter of improving the herds throughout Canada by means of these Cow Testing Associations. I made a little calculation since Mr. Thompson spoke in connection with what Mr. Whitley has said, and roughly it is this: If all the cows of all the herds in Canada were brought up to the standard of Mr. Thompson's herd it would increase the annual value of the dairy produce in this country by $80,000,000. There are about 2,000,000 cows in Canada; there were last summer, there are more now. Those cows did not average 4,000 pounds of milk each per year. If we allow the milk at one dollar per hundred, that is $40 per cow, and forty times 2,000,000 is 80,000,000. I believe it is possible to make a very large increase, and if we only increase the annual productions by twenty-five per cent., it would amount to a very large sum of money each year. If we reach the average of Mr. Thompson's herd we would be very little better than the average of the cows in Denmark or Holland.

It was my good fortune to visit Holland last summer, and I made some inquiries as to the production of milk. Dairying is the national industry in Holland, and they depend very largely on their sale of butter and cheese for their revenue on the farm. I would like to give you a few figures in that connection.

Holland is a very small country, only about 12,000 and some odd square miles, about equal to the area of what we call Western Ontario. They have less than 1,000,000 cows, and yet after feeding five million people, they exported $27,000,000 worth of butter and cheese last year, nearly as much as Canada exported. We think we are a good dairying country, but we are only beginning in this business, and if you can go over and visit these Dutch farmers you will find that they are leading us a long way in the production of milk. We have made great progress in this country in the last two years; our butter-makers have made great advances, and I do not think there are any cheese or butter-makers anywhere in the world that have studied the science underlying the work they are engaged in as cheese and butter-makers in Canada; but we do not seem to make the same progress along other lines as these other countries have. Here is a territory about the size of Western Ontario having a million cows and exporting nearly as much as we did with our 2,000,000 cows and the actual value was $27,000,000 last year.

A MEMBER: They did not eat any.

A.—That is a mistake. They do eat a very large quantity, and they have about as many people to eat it as we have in this country, and their production of milk is easily over double as much as ours.

Now let me give you the figures from one creamery. I know a creamery in the Province of Friesland where they have 1,150 cows supplying milk to that creamery, and the average of milk per cow is 8,460 pounds—for the whole creamery, not from the one herd. I have a record of one cow in the Province of Eleda. She gave twenty-one thousand, five hundred and twenty

nine pounds in 365 days. Of course we have to take into consideration that the pastures of Holland are probably not equalled by any other country in the world. The greater part of the country is on a very low level beneath the level of the sea and the rain fall is pumped out over the dykes and the pastures are always in a good condition. They are very rich land and they seem to be able to keep a very large stock on a given area. I have seen as much as a cow to an acre. By the way, the Dutch people say we have no right to call these cows Holsteins, they are Dutch. They claim they are pure-bred Dutch cattle. I saw a farm of a hundred and five acres, and they had thirty-five cows producing a large quantity of milk. There were eight heifers, twenty-five calves, two horses, and twenty-five ewes on a hundred acres, and all the feed is produced on the hundred acres, except the meal which is fed in the winter time.

The members of the Cow Testing Association will be asked to contribute a small portion to the cost of the testing, and the charge is twenty-five cents a cow or a minimum of a dollar per herd.

I found quite a number, having received these circulars, were asked as to whether they would continue, and they said they thought not. One man said, "I will have exactly the same herd in 1908 as I had in 1907, and I do not see any reason for testing the herd for two years in succession." The mere fact in testing the herd is not going to do any good. It is what we do by following this work up systematically that will bring any results. Another man said: "I found on testing my cows they ran evenly." I looked at that man's record, and found in five months there was a difference of 1,000 pounds in a cow, and yet he thought he had a uniform herd. We propose wherever an Association of twenty or more farmers who will join together, the Department will continue to do the testing, and we ask the members of the Association to make that contribution during another year. The organizations are being made all over the country during the present time. I want to make this further announcement: If the cheese factories and the creameries would take it up, and where any cheese-maker will undertake to do the testing, the Department will pay five cents per test, and furnish all the blank forms necessary for doing the work. In that case there will be no charge unless the cheese-maker wants to make it to the members of the Association. I find that a number of the cheese-makers have agreed to do that, and I think it is a very good arrangement indeed. The factories are undertaking to do this work because it is in their interest. They are dividing their attention because of the increase of the production of milk. If they would do that instead of trying to take patrons away from the neighboring factories, it would be much better. I do not make that offer unreservedly, because I would like you to know that the cheese-maker was competent to make the test.

Q.—Can you compare Denmark with Ontario?

A.—No, I would not. They do some things very much better than we do.

Q.—How many cows have they got on that one hundred acres?

A.—The one hundred acres I spoke of was not in Denmark; it was in Holland, and they certainly have more labor.

Q.—There are twenty girls on each farm working?

A.—I am not making any comparison. You are making the comparison. I am only telling you the facts as I found them, and you are making your own comparison.

Mr. A. Grou: I know of a herd that for nine years had the milk weighed twice a day, and never in these nine years was there an expression

heard that they would quit weighing. Not once in the nine years has there been a failure in weighing the milk. Those that become concerned about it are not worrying. They only worry whose heart is not in it. If you were to weigh every day and all the year around, you would have a double benefit, because you also want the scales in the feed room. Use your scales on the milk to show you what your feed is doing, and then you know just as your scales go up and down, the why and wherefore, and what to expect. Weighing will keep you in touch on the two hands of feed and production. I say, weigh your milk, and weigh is regularly. (Applause.)

FARM MANAGEMENT FROM THE DAIRYMAN'S STANDPOINT.

By J. H. Grisdale, Ottawa.

I want in the beginning to say that after many years' experience I must support very strongly the work Mr. Whitley has been doing to get you to test your cows, and I want you to pay special attention to the point made by the gentleman just in front of me, who got up and emphasized the importance of weighing the milk every day and twice a day. I think it is of very great value to know what your cows are doing in a general kind of way, which information you can gain by weighing three or four times a month. There is no greater help to a man who is anxious to develop and get the most out of his herd than this weighing day by day.

Mr. Ruddick said something about increasing our output, and compared what we are doing in this vast country with the output from a somewhat smaller population, numerically, in Holland. What I want to emphasize to-day is that we are not getting returns from our lands, and I want to discuss with you and suggest to you some ways in which we can increase the returns from our dairy farms.

If you will consider for a few moments what the average farmer in Ontario or any county, gets to-day and what he should get you will see that there is great room for improvement. I have been looking into statistics some few years on this subject, and I find that the average Canadian farmer who has 100 acres of land, most of it, or a good portion of it, arable, gets in the neighborhood of $600 or $700 revenue from it. There are not many farmers who get as small a revenue as that and expect to live on it; but there are many farmers with poor land who have a small farm and till it extra well and get larger returns. But on the average that is what the farmer is getting. Now, I maintain that is quite inadequate, and that is the first point I want to bring to your attention—the possibilities of farming and the fact that we are not living up to our privileges; we are not getting out of our farms what we ought to. What is the cause of this? I think I am right in saying that it is due to the method of farming we are following—due in a large part to our disinclination to employ more help to do more work on our farms, and in the second place, to our disinclination to follow any fixed line of farming, and to go about it in a good business way.

There are tremendous possibilities here. Let me illustrate first by giving you a few figures which I gathered together a year or so ago when I wanted to know what was being taken off our average farms in Ontario and in Quebec. I accordingly travelled around some and got considerable data here and there and I will give you the result.

In the first place let us take the farm where as little labor as possible is employed. I visited a number of townships not very far from here, some of the very best land that can be found in this world—no better land lies out of doors than I saw, and I have seen the land in many parts of the world—and yet in the Township of Lobo I found farms, thousands of acres, hundreds and hundreds of farms, where all the land, or practically all of it, was in grass and handled by a few contractors or speculators who were buying cattle and putting them there to pasture and selling them off in the fall. Those men tell me that they can count on running anywhere from 25 to 30 head on 100 acres. The speculators did not tell me, but the farmers told me that those men made about enough to pay rent and sometimes a little more; sometimes they had a fair profit and sometimes they had a mighty small one. That is, the revenue from such a farm would be in the neighborhood of three or four hundred dollars, or say $2.50 an acre.

Then I visited some other farms where there was nothing but grain or corn. They were good farms and they were handled just for the produce of the soil, no cattle kept, or at least just as few as possibly could be kept in order to supply the house. On this farm lived the farmer, sometimes a boy, and if not a boy then a man was hired and the farmer lived alone in the winter, and I found the average returns from that farm around $700 to $1,000 from the raw products, selling grain, hay, clover seed, and so on. Once in a while we would find a man who would do better, and just as often we would find a man who did not do as well, and the farms were going back. Of course if I had taken the year 1907 the revenues would be greater.

On that farm where the revenue was about $8 an acre, the labor employed was equal to a man and a half—one man the year round and one in the summer. Then I visited some other farms where they grew crops all summer, pastured a few cattle and took in a lot of steers to feed in the winter. Of some such farms I hav remarkably good returns. On one farm, where the man employed two men all summer, and one man in the winter, he had a revenue of from $1,200 to $1,500. You see there for two men and a half employed he had a revenue of from $1,200 to $1,500 on a hundred acres.

Then I visited another farm where a few pure-bred cattle were kept, and a few horses and steers and they were making anywhere from $1,800 to $2,400 a year.

There was another farm where they were dairying, and this seemed to be the top notch in the way of revenue. They were getting around $4,000 from one hundred acres. On this farm they were employing four men and a half; that is, four men the year round and an extra man in the summer. They kept a large number of cattle and swine and the revenue, one year at least, was $4,200 and some odd dollars, sometimes it came up as high as $4,500. Now this looks like a pretty good thing that a man should get from $4,000 to $4,500 from his farm, but it can be surpassed. Mr. Ruddick has given you an example of what has been done in Holland. Some of you are probably familiar with the man in Philadelphia who bought a little farm and found he could not keep 2 cows and a horse. In the course of a few years he was keeping 30 head of cattle and 2 horses and a couple of men and a boy on this 15 acres. It is not just a story that you hear, but it is corroborated and proven over and over again and has been investigated very carefully by men who were sent there particularly to look into this matter. You can, then, see the possibilities, and we are not living up to these possibilities in Canada. In this Canada of ours we are falling away behind this and we ought to be doing better. You say we cannot get the men. I be-

lieve we can if we would undertake to keep them the year around. I am not so familiar with your conditions in this county as I would like to be, but I know in our own district where the men are kept the year around, there is comparatively little trouble in holding men; but where a man keeps his employees only six months, he has a great hunt to get a man to work for the summer and he has to pay high wages. Of course you must expect to pay him good wages, and it is better to keep a man of that kind because he is cheaper than where you have a green man who knows nothing about it. If you will look at the figures I am giving you you will see that the whole success of these operations depends upon the amount of labor. Where there is only one-third of a man the revenue was $2 or $3 per acre; a man and a half, $7 or $8; two men and a half, $14 to $15; three men brought it up to $18 to $24; four or five men, $24; and on this little farm the number of men employed was equal to eighteen on 100 acres, and if you will figure that out you will find that every man left a good margin of profit to the man who was able to handle them.

I was very much struck by the question asked by a man in the gallery who wanted to know if it was true that in Denmark they had a whole lot of girls working on the farms. It is true. We do not have to ask our girls to work in our dairy. We have a country that is good enough to let the women stay in the house and I am proud to live in such a country. But let me say that every man who works here can make good wages, and for every man you have working on the farm you can make a good profit. I am confident every farm will pay in this country, because the average is going up, and we are going to see great improvements in the near future. Our returns are increasing; in fact we have to increase or we cannot live. Why do we get such small returns—because, we do not keep enough cattle or men. If you keep men you have to furnish them with employment, and I think the chief reason why our farms are not giving us returns is that we do not keep enough cattle on them. We are using too much land. In many cases we are land poor. A man gets a farm of 100 acres, and he sees another 100 acres near him that he has a chance of buying, and he says "If I can get that I will have 200 acres;" and he immediately sets to work and buys it; and instead of handling the 100 acres he had in a proper way, and making good returns, he handles the 200 acres badly. It is not necessary to have a big farm to make a good revenue. Take the farm where they make $4,000 a year. I can give you an example of a farm in Dundas county which consists of 120 acres, and where the farmer some few years ago was putting away $2,000 a year off that 120 acre farm. Now, you see, there was a good margin of profit there. He kept his family, paid his hired men and put away $2,000 a year. It is not absolutely necessary to have a big farm, if you will handle a small farm to the greatest advantage. Our land is not giving one-half the returns it ought to give. In the first place it is not sufficiently worked, and in the second place we do not keep enough cattle and we do not follow any system.

Mr. Ruddick mentioned a case where a Holland farmer had some 35 head of cattle, and a number of heifers and horses, and a large number of goats—nearly one head per acre. It is quite possible to keep one head per acre. I am not going to say that we ought all to keep one head of live stock per acre, but we ought to have that as an ideal. That is what can be done, and we should say to ourselves: "How near can I get to it?" We should not try to do something that is wonderful or altogether unusual.

On the Experimental Farm at Ottawa some years ago we took 40 acres of it and tried to see how many cattle could be kept on it. Everything that

was produced for them was produced on the 40 acres, and we found we were able to keep 28 head of cattle, and I think one year we kept 29 head. At the present time we have at the Experimental Farm 200 acres, and we have 180 head of cattle and horses and 30 sheep, and a great many pigs. We do not buy any rough food, but we buy meal; but, leaving the pigs out, we do not buy any meal. We grow enough for 160 head of cattle, and in order to do that you must utilize every acre to the best advantage, and how to do that is what I want to bring to your special attention to-day. How can we increase the productiveness of our land?

In the first place, we must try to grow crops which are suitable for our purpose. I am talking to-day to dairy farmers, but practically the same thing will follow in the case of a beef farmer. We should grow crops such as roots or corn. I say preferably corn. I think roots are somewhat better for cattle than corn, although on some experiments last year we found practically no difference. Corn contains more dry matter than roots, but there is very little difference between the two. You can get almost as many tons of corn per acre as of roots and it is cheaper to grow corn, because, the labor is less. There is not so much stooping, and all the work in connection with the corn can be done by horse labor, and it is not so hard to get men competent to handle it. I would be the last one to advise a farmer to give up roots and go into growing corn; the combination of the two is the best. You should also grow plenty of clover. You can grow timothy for your horses; but if you make your clover hay well there is nothing better than that for horses unless you want to speed them. I do not know anything that will beat clover for working horses. Grow grains that are suitable for your farm. I think the principal grains are oats, peas, and barley. Wheat might be grown to a small extent, but the man who grows wheat to sell makes a mistake. Let those chaps in the west grow the wheat. During the last year or two I visited a number of farms in Manitoba where they have been growing wheat for a number of years and they are sick of it. They have not the opportunity of bringing up their fields, and some of them are wishing they had gone into live stock some time ago. The less wheat we grow the better for our general prosperity. Growing a lot of crops and feeding them at the wrong time is just as bad as not growing them at all.

I heard a gentleman in the audience saying something about the difficulty of working hard all day and going in late at night and milking his cows; and that is where the average dairy farmer makes his mistake. Keeping your cows ought to be your first object and not the last. The man who says his cows are a chore is not a dairy farmer. He is like a woman who is keeping hens, and he will not make a success of dairy farming. If we are going to be dairy farmers the dairy cow should take precedence. True, you have to grow crops, but you must utilize that feed to advantage or you are wasting your energy and your effort, and you are not going to make the income you should. If you are going to handle the dairy cow to advantage in this country where summer dairying is the principal business, you must take good care of the cattle in the summer. It is absolutely necessary that summer feeding be properly looked after. We are, all of us, too keen to get enough food put by for the winter, the fall, and the spring, and we neglect the cattle in the summer. Every farmer who is going to make a success of dairying must provide for handling his cattle and feeding them properly during the summer months, and any scheme of handling a farm for dairying purposes, into which summer care does not enter is sure to prove unsatisfactory and give small returns. You should grow enough corn so that you can fill your silo with feed and have enough to feed them in the summer. I

believe there is nothing like corn, and the man who is dairying and has no silo is making a big mistake. I would not handle a dairy farm for a week without planning to have a silo put up right away. I never was so much struck with the importance of that as when I undertook to manage a little farm some few miles away from Ottawa on which there was no silo. It had been handled two or three years without a silo, and then a mighty resolve was made to draw in some of the cash that could be got together and put up a silo, and no investment made on the farm gave such returns: it had a wonderful effect. Just think for yourself all the trouble you have going out with a stone boat and chopping those stooks of corn out from the ice and drawing them in to the cattle. We were watching this operation as we came along on the train; a man cutting the corn out from the ice and drawing it into the cattle.

I know a few of my neighbors have strong opinions on this subject. I would advise you to save up a few dollars, and get enough to make the first payment on your silo. There is no one thing that a dairy farmer can do that will be of greater advantage to him than to run his farm in a way to have enough silage to have it all the year around; and if you cannot do that lay out your farm so that you will have an area in which you can grow feed for your cattle in the summer. I have a rough sketch of what may be called an ideal division of a dairy farm.

[The speaker here described his system of rotation of crops as given in the report of the Eastern Association under this cover.]

There are several other rotations which might be considered, but I do not know of any that will give better results than the four year rotation. Where the land is left two years in grain and three years in hay or pasture it gives very good results. Mr. R. Ness of Howick, Que., follows that rotation, still. he does not get the returns that he might. One objection which I have heard given is that corn will not grow on heavy land. That is all nonsense. The best crop of corn I ever saw was on a heavy clay field. The only condition necessary is that you get humus into it—some vegetable matter into it by growing clover or some green crop. Get it opened up and then have the surface water carried away by tile draining

Mr. Ness has a heavy blue clay and he never has failed in his corn. We have some land of that description at the Experimental Farm, Ottawa, and we never have a failure where the land is properly drained. Just as soon as you get the surface water off it is all right. I do not want you to think this is all idealistic, and not possible of being put into practice. There is not a farmer who cannot put this into operation. If you cannot see your way clear to put your farm into four fields, follow the rotation of the fields that you have; keep track of the returns and see the advantage. I know a number of farmers who are following that four year rotation with success. I want to get after the fellows who are not giving their farms a fair show. They are working some parts of their farms to death, and other parts they are overfeeding, and by that they are getting very unsatisfactory returns.

Q.—What kind of manure do you put on?

A.—Green manure every time. We find that a ton of green manure gives just as good results as a ton of rotted manure.

Q.—Do you draw it out in the winter?

A.—Draw it out as we make it. We spread it as long as the snow is not too deep. When we are not sure where we are spreading it we stop.

Q.—You do not use the spreader?

A.—We do as long as we can use it. We have more snow than you have, and we cannot run it in the deep snow.

A MEMBER: The way we do we draw out once a week and then pile it up. We spread so much, and then we put a little pile so that we will know where we stopped spreading.

Q.—Would it pay to put it in a heap in the field, and then use the manure spreader in the spring?

A.—If your land is uniform in character so that you cannot get on to any one part sooner than the rest, and you have lots of horse power, that is all right; but where you have a farm that has some high land that you can get on earlier than the rest, I think it would pay to spread the manure in the winter, so that you could go on with your plowing the first thing in the spring.

Q.—Do you work that spreader yourself?

A.—I can. I have done it; but they do not pay me at the Agricultural Farm for using the manure spreader.

Q.—Do you plow your corn land after you take off the corn?

A.—I run the gang plow over it and turn it usually. I just want to get these stalks covered. In the case of a root crop we plow it. If I could pasture the crops off I do not know that I would plow it. You can go over it quickly with a broad two-furrow gang plow, and one plowing is equal to three or four harrowings.

Q.—Did I understand you to say you plowed down 22 inches of clover or timothy?

A.—Clover.

Q.—What kind of clover do you grow?

A.—Alsike, and red clover. We count on about 25 per cent. of red clover in our hay the second year.

Q.—What about lucerne?

A.—I am not going to talk on that subject; there is a man here who is an enthusiast on it.

A MEMBER: What about that man who made $2,000 on his farm every year. I want to know where he lives?

A.—The man who gave me that information was a reliable man.

Q.—I want to see that man. I cannot clear that, and I have 600 acres.

MR. GRISDALE: How many cattle do you keep on these 600 acres?

A.—More than profitable sometimes.

MR. GRISDALE: That is not an answer.

A.—I have had 150 sheep and from 80 to 75 cattle. I have had that for 40 years.

MR. GRISDALE: That is about 15 head of cattle to the 100 acres, and the man I mentioned had 50 on one hundred acres. His name is J. Smith, of Chesterville, Ont.

A MEMBER: How would plowing twice do?

A.—I would rather not plow twice. Plow early and work the land well and then ridge it up with a double mould board; that is better than plowing the second time. We have tried that side by side with fall plowing and found that we had anywhere from one-half to two-thirds of an increase.

Q.—Do you advocate ridging in the fall?

A.—I have tried it, but I do not like it.

Q.—Do you find it much trouble to work down these ridges in the spring?

A.—No. If you take a disc harrow—they will work down easily.

Q.—Do you go cross-ways with them or length-ways?

A.—I find just about as good results from one way as the other. If you use a disc harrow and strike them right they split very easily.

Q.—How deep do you plow?

A.—Four to five inches.

A MEMBER: A man in our neighborhood pastures, and then puts in oats, and then roots. We did that six years, and had excellent results from it; but I think this plan is more satisfactory, because, you cannot always get your land ready for the grain; if you are going to sow grain you must have your land plowed early or you will not get good results.

Q.—Would it not pay to put the proceeds of the wheat into some other grain to feed on the farm?

A.—Yes, if you did that, but there is always the temptation to put it into the bank.

Q.—Would it pay a man to grow wheat and put the money into other grains or to grow the other grains and feed them?

A.—That will depend somewhat on the market prices. This year it would pay you better to grow your wheat and buy bran, although bran is a high price.

THE CHEAP PRODUCTION OF MILK.

BY H. GLENDINNING, MANILLA.

I come on at the last of the progamme, and I want to make use of everything that I possibly can. I am very anxious to make use of the speakers who preceded me, and I would say that I endorse what they have said in reference to the crops, and so on. I also want to make use of Mr. Thompson's cows this afternoon to illustrate my points regarding the production of milk. Mr. Whitley told you how to select your cows by testing and weeding out. I believe that the dairy cow is a machine in the hands of the farmer; and any manufacturer in this town who is engaged in the manufacturing business, if he finds he can secure a machine that will turn out more goods at a little less than the old machine that he has in the shop already, he has no compunction in discarding that machine and getting a better one. Too many dairy farmers in the Province are working with the wrong kind of machine; and again, too many men have pretty good cows, and are not feeding them properly. I believe, that if all the cows in the Province of Ontario were properly fed, it would be a surprise to many of the people. It is important to know how to feed the animals you have got. You have heard of the grand results that Mr. Thompson had in his cows during the past year. Now, these results were not obtained by chance. He has been working along these lines for years, and getting the best kind of cow and using the best kind of feed he can obtain. I noticed that Mr. Thompson stated that he fed a quantity of bran. I am very much pleased with the bran. He said he had no doubt but it was pure. Somebody else in the audience seemed to think there was adulterated bran. I want to say that I consider bran one of the best feeds we have for the dairy cow, but when a man feeds a lot of bran, at the price we have to pay this year, it does not leave very much profit, even though he has cows like Mr. Thompson's. I believe the farmers of Ontario should try and produce all the food for their cows on their farms. I believe that the main object we should have is to make money out of them; this is the point I try to work upon. If we have not got the food, we have got to buy it. I want to endorse the statement made by Mr. Groh, in reference to the silo. I believe the dairy farmer cannot make a great success unless he has a silo. You know under natural conditions, that the greatest flow of milk is obtained from the cow while she is on the grass, along in the month of June while the grass is fresh, juicy, succulent and very palatable,

plenty of it, the right temperature, free from flies, plenty of fresh water and sunshine. These are the conditions under which you get the best results, but we cannot carry these through the whole season. We must try to carry them through the winter if possible. I believe it is possible to make milk cheaper in the stable than it is in the field. I believe we can make it cheaper in the winter time. I know that statement is liable to be pretty severely criticized; but I am to make myself clear upon that point before I am through. We must have succulent food, and we can get that in the form of corn silage. There is only twenty-one pounds of dry matter in one hundred pounds of silage, the balance consists of water. In protein there is only nine-tenths of a pound in one hundred pounds of corn silage. There are a great many people in this country who make a great mistake in building a silo and feeding corn silage almost exclusively, and at the end of the year have said they did not have very good results, and have gone out of the business. I believe I would be inclined to do that myself. But feed this food along with something else, and then we get good results. Depend upon your corn silage for succulency and palatability. These are things that are required in feeding of the cows. Where we feed bran with corn silage we have had excellents results. The protein in the bran is 12.2 pounds in every hundred, and when you feed bran in connection with corn silage it gives you a balanced ration, and if you feed this food you are sure to have a big flow of milk. Bran has got away out of sight. I can remember the time when bran was considered of no value. I have seen the chutes turned into the creek from the grist-mill and the bran allowed to run down the river. There are men here who have seen the same thing. But you know Dairy Conventions, Agricultural Societies, Farmers' Institutes, Agricultural Colleges, and these things, have been preaching up the value of bran, and we have preached it up to the highest price, and there is not very much in it from a commercial standpoint. We have, therefore, to turn our attention to something else. Our main object is to get that protein. I want to call attention to the fact that the average milk has a little less than 13 pounds of solid matter per 100, and still in that 13 pounds there is 3.6 pounds of protein. If you want to produce milk you must feed largely of that nutriment. You cannot expect to get protein out of a food that does not contain that, any more than you can expect to get flour out of a mill by putting sawdust through it. You must have the right kind of material to get the flour, and you must have the right kind of material to give the cow in order to get the milk.

I do not need to ask you the question, what are you going to feed in its place, because you have been told by Mr. Grisdale. Alfalfa hay will take the place of bran as near as anything we have got, and we can produce it ourselves. You notice that one hundred pounds of alfalfa contains eleven pounds of protein, nearly as much as that of bran. We can put alfalfa hay in the barn where you have an average crop of from five to six tons per year, cutting it three times. You can produce more on good land and proper treatment. You can produce that hay and put it in your barn at $2.00 per ton, against how much for bran? What are you paying for bran?

A.—Twenty-two to twenty-five dollars a ton.

A MEMBER: You cannot grow five tons of alfalfa to the acre on land here?

A.—Yes, you can, the trouble is you don't know how.

(Mr. Glendenning then described his experience in growing alfalfa as given in his address at the Convention of the Eastern Association. See page 23.)

He then added: I say by all means get the alfalfa nitro-culture, and apply it to the seed before you sow it, unless you have already grown it upon

the field. If you have grown it for a number of years on your field, the chances are you have that bacteria already in the soil, and you do not need to apply it in that place.

Q.—If you had been growing red clover, would that do?

A.—No, the red clover bacteria will not inoculate alfalfa, but the bacteria works upon the clover and will inoculate it. I asked the bacteriologist at Guelph that question about a year ago, and he said: "We do not know whether it is the same bacteria that works upon it or not, but we know it is interchangeable." Has anyone present in this audience ever tried that culture? If there is anyone I would like to know. There does not appear to be any person.

Q.—What is the cost?

A.—Twenty-five cents, for enough for one bushel of seed.

Q.—Do you cut it at an earlier stage than other clover?

A.—Yes, we cut it when it is coming into blossom. The ideal time is when one-tenth of the blossoms are out.

Q.—Do you salt it?

A.—No. I would not salt alfalfa, or any kind of clover. I have very decided objections to salting hay. Where there is a heavy salting, it comes out brown, it never comes out green. Keep salt away from it, and you will have better hay. I think a good many people fail in growing alfalfa because they do not get a good quality of seed, and then some have failed on account of not getting the culture. The man who pastures his alfalfa field in the fall of the year, can say good-bye to his alfalfa, for it will not stand it. I know that many people say it is a perennial plant, but I know when you pasture alfalfa it simply dies out, and there are a great many people will let their stock, horses, and sheep run on the field through the winter. If a horse gets on the alfalfa field late in the fall or winter, he goes and bites the crown right out, and every time he bites the crown it is a dead plant. I have a field that has been cut for five years, that is the oldest field I have at the present time. We have never allowed anything to run on that field. The gate-way is in the centre of the field, and we never go in there excepting to cut, or to draw out the alfalfa, but at the gate-way you can notice the plants are short and thin, they will not stand tramping or pressing, and if that is the case when the weather is considered best what would it be in the fall of the year when the soil is soft and wet.

Q.—Do you manure that piece?

A.—Yes, it was manured the second year after there were two crops cut off. That is three loads of very short manure to the acre, but the best dressing we ever gave it was with hardwood ashes. It seems to respond to that better than anything else.

Q.—How much does it cost to seed down an eight acre field of alfalfa?

A.—I included that in with the rent. $4 an acre for the land, without any buildings, is a little more than what it is renting at now.

Q.—Why not coil the second crop?

A.—Because we can put it in with the loader, and I must say our best hay is that that is put in with the loader and fork. I want to say that last year and this present season, we have not fed one pound of grain or bran to our dairy cows, and I want to give you two or three instances from our own feeding. First, I will give you one cow that has been just two weeks in. This record does not apply to the first week at all, but it commenced after she had been a week in, and I find that she gave 291½ lbs. of milk in seven days, or an average of 41½ lbs. a day, testing 4 per cent. of butter fat. Now, we feed fifteen pounds of silage and cut straw, and sixty

pounds of cut roots, and twenty pounds of alfalfa hay. We fed that cow for 9½ cents per day, and she is producing 41½ lbs. milk testing 4 per cent. fat; that would be eleven pounds of butter fat in seven days. We are supplying cream to the creamery, and after paying all expenses of making, and everything in connection with it, they paid us 28 cents per pound for butter fat. The amount we would receive for that butter fat at the prices we were getting in December would be $3.25. The cost of feeding would be 66½ cents, leaving us a profit of fully $2.58 for the seven days. Do you believe you can produce milk any cheaper in the pasture than you can in the stable? You will notices there is not a pound of any kind of grain in that except what the corn silage contains.

Q.—Do you mix your silage and cut straw together?

A.—The silage freezes more or less on the top of the silo, and that silage is thrown down and mixed with the cut straw, and a couple of pails of water thrown on it, and this is allowed to lie there until the next morning.

Q.—Is there any grain in it?

A.—Yes, we aim to get as much grain as possible.

Q.—Do you salt it?

A.—No; we salt each feed, of course. There is a small handful of salt put in for each cow. In that particular stable there are sixteen cows, and we put in equally sixteen small handfuls of salt, it is turned over and allowed to lie there about twenty hours.

Q.—Do you mix your pulped roots with that?

A.—No, we do not now. Some days when you want roots the wind-mill will not run, and the consequence is some days there are roots, and some days there are not; and now the man has stopped pulping the roots and is feeding them in the unpulped state. One day the man was busy, and he did not get the silage mixed up as usual, and he threw the cold silage from the silo and fed it to the cows, and he said that if it had not been for that this cow would have made an average of 42 pounds of milk during the week. The result of the whole sixteen cows was that he had just one pail of milk less that day than he had other days; so that I think it shows that there is something to be done in the way of properly preparing feed for the cows.

Q.—Would that cow require grain afterwards?

A.—She might milk down. I would not say that grain would not do good, but I say that if you add grain, you add a great deal to that ration. I know that cow is a fleshy cow, and she has milked down in condition.

Q.—Supposing the wind was at all times so that you could pulp your carrots?

A.—I would say to put your pulped roots in. We keep a fairly accurate record of our cows.

Q.—Are you done with the clover?

A.—I do not know.

Q.—Is lucerne as good as red clover?

A.—Much better, there are 6.8 of protein in 100 lbs. of red clover, in the case of alfalfa we have 11 lbs.

Q.—Would you give up red clover and go entirely into alfalfa?

A.—No; because in the case of red clover you can keep up your rotation, and with alfalfa you cannot have a rotation. I lived in a country for seven years where they had lots of that clover, and they raised more of that then they did of the other.

Q.—You would not pasture alfalfa at all?

A.—If you pasture alfalfa it will disappear; it should not be pastured unless you want it to disappear.

Q.—When you are done with alfalfa what is your land good for?

A.—It will raise you the biggest crop of corn you ever saw in your life. Pasture it in the fall of the year. Put you horses on it, and let it lie until the warm weather comes in the spring, about the middle of May plow it up and it will plow like an ash bed.

Q.—It will crack?

A.—No. The roots will be rotted by the spring, and it will simply be like a lot of manure.

Q.—Would you put timothy with it?

A.—I have very serious objections to putting timothy or anything else with it. You would not get much good of your timothy, because when the first cutting came your timothy would hardly be started.

Q.—Would not the timothy help to cure it?

A.—No.

Q.—Is there any danger of it dying out the first winter?

A.—No; alfalfa is hardier with me than the red clover.

Q.—What kind of land have you?

A.—Clay loam.

Q.—Did it kill out last winter?

A.—No. I do not think that land that will heave is good land for alfalfa. Generally about the second or third year you get your biggest crop. I have cut this for five years, and it is in good shape, and it will be in good condition for eight or ten years. June grass creeps into the field, and I have never seen a field of alfalfa but what there has been some trouble with the June grass.

Q.—How does alfalfa do on the Experimental Farm at Ottawa, as compared with the red clover for wintering?

Mr. GRISDALE: The year before last we lost nearly all our red clover and the alfalfa came in better shape. Where the alfalfa was on high ground and the snow did not blow off, it came through in good shape. But where the snow blew off it did not come through; where there was water in the hollows it died out.

Q.—How many cows have you?

Mr. GLENDINNING: I have sixteen at the present time giving milk.

Q.—How do you store your roots?

A.—This year I have between eight and nine thousand bushels of roots.

Q.—Will the cows winter through on that ration?

A.—Yes. We wintered them all last year on that kind of ration, and it was corn silage more than roots. Cows thrive right up on it. We had another cow giving 28 lbs. of milk a day, testing 4.4 per cent. of fat. In July she gave 28 lbs. On the first day of January my herdsman told me that that cow was milking pretty nearly as well as she had in the summer. I got the scales and weighed the milk in the morning and at night, and I found that it weighed 25 lbs., but instead of 4.4 it tested 5.2 per cent. of fat. She was giving more butter fat in the stable on the first day of January than she had in the month of July.

Q.—How much seed would you recommend planting to the acre?

A.—15 to 20 lbs.

Q.—What crop did you get the seed from?

A.—From the second crop.

Q.—Would you be surprised to hear of a catch of alfalfa where you only sowed 3 lbs. to the acre?

A.—If every seed made a catch you might have a pretty fair field, but I think you would have a lot of heavy stalks, and I would not like to risk it.

Mr. Groh: We grew three acres of alfalfa, and we found a lot of weeds in it that came from a foreign country. I say you should not be willing to introduce a new weed, and I would warn the people to watch for any new weeds. If you let them get abroad we might have another enemy to fight.

REPORT ON COMPETITIONS OF CHEESE AND BUTTER.

Prize List.

September White Cheese:

		Total Score
1st Prize,	Mary Morrison, Newry	96.
2nd "	Jas. Paton, Atwood	95.08
3rd "	J. E. Stedelbauer, Fordwich	95.
4th "	Alex. McCallum, Kintore	94.91

September Colored Cheese:

1st Prize,	C. Donnelly, Scottsville	95.66
2nd "	W. A. Bell, Pine River	94.50
3rd "	G. R. Stone, Currie's Crossing	94.41
4th "	M. Stevens, Carholme	94.33

October White Cheese:

1st Prize,	Mary Morrison, Newry	95.16
Tie for 2nd "	W. S. Stocks, Britton	95.
" 2nd "	J. E. Delmage, Trowbridge	95.
4th "	J. T. Donnelly, Union	94.83

October Colored Cheese:

1st Prize,	E. Ginther, Winger	94.83
2nd "	J. T. Donnelly, Union	94.50
3rd "	J. E. Stedelbauer, Fordwich	94.33
4th "	F. McNeil, Listowel	94.16

Box Creamery Butter:

1st Prize,	Jno. Cuthbertson, Sebringville	92.50
2nd "	R. A. Thompson, Atwood	92.16
Tie for 3rd "	F. E. Brown Petrolia	92.
" 3rd "	R. C. Bothwell, Hickson	92.
" 3rd "	E. M. Johnston, Innerkip	92.

One Pound Prints, Creamery Butter:

1st Prize,	R. Johnston, Bright	94.16
Tie for 2nd "	J. B. Doan, Birnam	93.16
" 2nd "	R. C. Bothwell, Hickson	93.16
" 2nd "	W. Waddell, Kerwood	93.16

Box, October Creamery Butter:

1st Prize,	F. E. Brown, Petrolia	93.58
2nd "	W. Waddell, Kerwood	93.14
3rd "	J. W. Wilson, Keyser	92.31
4th "	J. R. Almont, Welland	91.67

Special Prizes.

Cheese Buyer's Trophy, for Highest Scoring Cheese. Mary Morrison, Newry.

Special, September White. By The Ballantyne Dairy Supply Co., Stratford. J. E. Stedelbauer, Fordwich.

Special, September Colored. By C. H. Slawson & Co., Ingersoll. C. Donnelly, Scottsville.

Special, October White. By C. H. Slawson & Co., Ingersoll. (Tie) W. S. Stocks, Britton, and J. E. Delmage, Trowbridge.

Special, October Colored. By The Ballantyne Dairy Supply Co., Stratford. J. T. Donnelly, Union.

Special. By The Heller & Merz Co., New York, to the Butter Maker securing the highest score on butter in Class 3 and 4, colored with Alderney Butter Color. R. Johnston, Bright.

Special. By The Heller & Merz Co., New York, to the Butter Maker securing the second highest score on butter in Class 3 and 4, colored with Alderney Butter Color. F. E. Brown, Petrolia.

Special, Best Finished Cheese. By the J. B. Ford Co., Wyandotte. J. E. Stedelbauer, Fordwich.

Special, for the Neatest and Most Attractive Exhibit of Butter. By the J. B. Ford Co., Wyandotte. Jno. Cuthbertson, Sebringville.

Mr. Paget, Past President, who occupied the chair in the absence of the President, said: There is one characteristic feature in connection with the report of the judging contest, and that is the uniformity both in connection with the cheese and butter. All of you who have been over to the hall, and have looked over the cheese, would see that they were a most uniform lot of goods. I can remember when we first introduced the exhibition of butter and cheese in connection with this convention that that was not the condition that existed. We found all forms and size of cheese, and we found that the scores varied very many points. Why is it that that condition of affairs has been remedied? I think you will admit, without any hesitation whatever, that it is due almost entirely to the system of instruction that has been carried on by the Association during recent years under the guidance of the Department of Agriculture. If there is one thing in which we have advanced it is in the producing of a uniform article of cheese and butter; and that is very strikingly demonstrated in connection with this exhibition in the hall at the present time. You will notice that there is only a very small range of difference in the scores of any of those who have taken prizes. And that is not all. If you will read the score cards on the cheese you will find that even those that do not score the highest are only a point or two below some of the prize cheese. I think it is something that the Association and the Department of Agriculture can congratulate themselves upon, as well as the dairy instructors of this country. If there is one feature that helps our dairy industry more than another it is that we produce a uniform article of goods. We have accomplished that mainly in connection with this work by our system of instruction.

INSTRUCTION IN CHEESE FACTORIES IN WESTERN ONTARIO, 1907.

By Frank Herns, Chief Dairy Instructor and Sanitary Inspector.

I take pleasure in presenting my first annual report of instruction in Western Ontario. Your former Secretary-Treasurer and Chief Instructor, resigned in April, and it was with considerable uncertainty on my part as to the future that I took charge of the work. However, Mr. Barr had the work so well organized during his term of office that things worked out during the season of 1907 very well indeed.

This season will be remembered as a successful one for the patrons, high prices prevailing, although the make was somewhat light in some sections owing to poor pastures. It is to be hoped milk producers will make preparation for summer silage or soiling crops for 1908. The makers have not all realized the profits they should, owing to short makes, and too low prices for manufacturing.

The system of instruction was changed somewhat this year. The instructors were appointed sanitary inspectors along with their former work of instruction. The fees for instruction work formerly paid by the factories were not asked for this year, the Ontario Department of Agriculture very kindly taking over the whole financial responsibility and taking charge of the instruction work in conjunction with your Association. The groups were enlarged and changed as follows: Ingersoll and Woodstock Group, 36 factories; Stratford Group, 35 factories; Listowel Group, 34 factories; Simcoe Group, 33 factories; Brantford Group, 29 factories; London Group, 34 factories; Northern Creameries, 36; Southern Creameries, 37; while 13 cheese factories outside of the groups were looked after by myself. Six of these were closed this year, making a total of 207 cheese factories and 73 creameries visited this year. There was one instructor less employed this year.

Before beginning work the instructors spent a few days at Guelph, during which time lectures and demonstrations were given by the professors of the College, which were very much appreciated by the instructors. Considerable time was taken up in thoroughly discussing the work for the year, so that all started out with a uniform method along every branch of the work. The quality of the cheese up to about the end of June were very fine. The weather was cool, and nature took care of the milk. Patrons should consider this a good object lesson in cooling milk. When the hot weather came we were troubled in some cases with cheese showing little round holes like gas holes, and in a few cases the cheese were very near the acid line, but still showed the holes. We found that by setting as sweet as possible, cutting finer and getting the curds firm before acid enough came on for dipping, stirring fairly dry and leaving a little longer before milling, these defects were overcome. The trouble seemed to be that the milk contained gas, and was in some cases over-ripe, and it was hard to get the curd firm before they would have enough acid to dip, giving more acid in whey only made it worse. During September a few of the boys got the cheese just a little weak. The milk seemed to be a little richer earlier in the fall than usual, and the curds retained more moisture than expected. The cheese on the whole this year in Western Ontario were very good. Very few acidity cheese were reported. There is still, however, plenty of room for further improvement.

More improvements have been brought about this year in the sanitary conditions of our factories, particularly in the matter of whey tanks, drains, floors, equipment, and inside and outside appearances. I do not think our factories were ever in better condition. Some, however, are not up to what they should be, and not kept as clean and tidy as they might be. We have been promised improvements at these factories. We have tried to use good judgment and common sense in dealing with sanitary conditions, believing that improvements could be brought about through time. We tried not to abuse the position in which we were placed, and so far as I am aware this has proven the best policy. I have written to, and in a number of cases visited, several factories where the sanitary conditions were extremely bad, and in every case but one the necessary improvements were made without any further trouble.

The instructors visited a number of patrons in regard to the care of the milk, giving instruction in this most important point. Improvements were made where asked, particularly in the matter of new cans to replace old and rusty unsanitary ones. The Department of Agriculture very kindly consented to having a special officer appointed by your Association to deal

with any cases of milk adulteration which might be found by the makers or the instructors. Mr. I. L. Farrington received this appointment, and I believe performed his duties to the entire satisfaction of all concerned. Sixty patrons were prosecuted for delivering deteriorated milk at the cheese factories. They all, except one, practically pleaded guilty to the charge, and were fined from $5 to $35 by police magistrates before whom they were taken whenever possible. This is having a good effect, and will soon stamp out to a great extent the tendency to tamper with milk. No settlements outside of court were allowed. At all the district meetings this work was highly commended, and was recommended to be continued along with the work of instruction. This is also having another effect, that of renewing the agitation for the payment of milk by the test at our cheese factories; and this winter, at the annual meetings, I believe several more will adopt the system.

I do not think there is anyone but who will admit that returning ordinary whey in the cans has an effect on the milk supply. It does not seem practical to return whey in any cans except those in which the milk is drawn. I believe the whey should be as clean when returned as we expect the milk to be when delivered. Certain flavors, due to bacteria, may become present in one or more patron's milk. This is brought to the factory, many times undetected, as they are not far enough advanced. These bacteria are not killed in the process of making; they pass into the whey tank, and are widely distributed through the milk cans among the other patrons. Thus the entire number of cans may become contaminated through the medium of the whey. If not sterilized their growth rapidly increases and becomes present in almost all the cans. It becomes necessary to free the whey from these undesirable germs. We may clean a whey tank every day, but unless the tank is thoroughly sterilized with live steam it is not clean from a bacteriological standpoint. In the case of wooden tanks, the wood being somewhat porous will contain germ life impossible to dislodge with ordinary washing. The whey tanks have been kept cleaner this year than ever before, but there is still room for improvement. I would strongly recommend the heating or pasteurizing of the whey in the tanks, heating to 165 degrees, not over, or the albumen in the whey will coagulate, making slimy whey. It will keep the tank cleaner and make them easier to keep clean; it keeps the fat in the whey; there is no fat to dispose of when the tanks are emptied, and this has always been one of the main excuses for not cleaning the tanks; it keeps the whey sweet, which is an advantage to patrons; it will inhibit the growth of all germ life in the whey; it makes the cans easier to clean, and there is no old sour whey flavor after the cans are washed; the cans will wear longer since sweet whey does not eat off the tin as sour whey does; the whey can be fed to young calves and pigs, which increases the feeding value; it will kill and prevent the bitter or yeasty flavor, and has done so at three factories this past year that had been troubled with bitter or yeasty flavor for years. It also prevents the spread of disease and other germs in the cans, particularly tuberculosis, which might affect the hogs, and lessens the chances of having over-ripe milk during hot weather, as it gets rid of the acid starter so likely to be present in cans not properly sterilized after washing. This must be done every day, and done properly, or it will be of no benefit. It will cost about 50 cents per ton of cheese, or about 50 cents to $1 for each patron, which is a small cost when the benefits are considered. Since the patrons get these benefits, they should be willing to pay for pasteurizing the whey.

There were 207 cheese factories visited past year by our instructor, 46 more than last year. There were 620 full day visits and 605 call visits, making a total of 1,225 visits made to the factories. 1,807 curd tests were

made and 840 of these samples were found tainted. 588 patrons were visited, being 83 more than last year, although we had one instructor less. 35,074 lactometer tests were made, or 8,656 less than last year, with 46 factories more to look after and one instructor less. 1,700 Babcock tests were made, or 894 less than last year. This shows less attention given to milk testing by the instructors, and more attention paid to visiting patrons and improving the milk supply. 332 samples were found to be adulterated, 272 on one test, and 60 on several tests. 1,688 new milk cans were bought and 298 cans repaired, showing co-operation of the patrons with the instructors in the matter of replacing or repairing rusty and worn out milk cans.

181 are using pasteurized culture.
189 are using the acidimeter.
19 only are paying by test.
12 only have a cool curing-room.

The following improvements in factories are reported.

31 buildings were painted either inside or out.
60 factories made general repairs.
16 put in new floors.
24 repaired the floors.
23 put in new whey tanks.
4 were built, entirely new.
9 were entirely remodelled.
2 put in new drains.
6 drilled wells.
7 put in cool curing-rooms.
23 put in new vats.
24 put in new hoops.
11 put in new curd mill.
12 put in new presses.
12 put in new curd knives.
12 put in new agitators.
15 put in new sinks and racks.
63 factories got new pumps, repaired boilers, got new scales, put in new engines and boilers, got new weigh can, hot water barrels, etc. Total expenditure of $35,882.00, or $7,132.00 more than last year.

It is very gratifying to note the continued improvements in our factories. An experimental sewage plant was installed at Innerkip factory by the Department under the supervision of the Provincial Board of Health, and I believe is giving good satisfaction.

I personally visited 131 factories and have attended a number of annual meetings, as have also the instructors. A large number of applications for speakers to attend annual meetings during January, February and March are coming in. At many of these meetings the patrons passed resolutions agreeing to pay the cheesemaker 50 cents per ton of cheese for pasteurizing the whey. At some of the meetings they also very cheerfully raised the price for making.

District meetings were held during during November and December in the different groups. Some of these were exceptionally well attended, while others were not. Considerable interest was shown in the discussion of the several subjects brought up. Resolutions were passed at all the meetings re not receiving milk rejected at neighboring factories on account of flavor; also not to receive milk from a neighboring factory where the patron left for no other reason than being fined for sending adulterated milk. The question of a cheese scoring contest for the coming season was discussed very favorably at the different meetings.

The instructors have all worked hard, and have done their best to make the season's work a success, and I wish to express my appreciation of the loyalty and kindly feeling which the instructors have shown towards me and the work assigned them this year. Without their hearty support and good feeling my work would not have been so pleasant.

I also wish to express my thanks to the Directors of the Association and the members of the various committees for their hearty co-operation and help they have given me.

I wish to thank the cheese and butter makers, factorymen and buyers for their kindness to me and the very pleasant relations existing this year. They all had a pleasant word of encouragement, and very kindly refrained from criticizing our mistakes too severely.

Cheese Factories Instruction.

Group and Instructor.	No. of factories visited.	No. of visits.	No. of call visits.	No. of curd tests made.	No. of samples tainted.	No. of lacto-meter tests.	No. of Babcock tests made.	No. of patrons visited.	No. of new cans bought.	Expenditure.
										$
Ingersoll & Woodstock, E. N. Hart	36	116	102	704	477	5,557	211	121	65	10,709
Simcoe.....Geo. Travis	33	68	138	173	41	4,299	189	61	500	1,850
Brantford.....R. H. Green	29	103	113	153	56	10,290	568	89	434	1,956
Stratford.....Alex. McKay	35	130	100	541	220	3,098	204	202	120	11,525
Listowel.....J. R. Burgess	34	101	75	231	43	5,060	120	52	142	7,262
London .....W. Hamilton	33	103	61	5	3	6,370	419	3	427	2,580
Outside factories.....F. Herns	7	7	16	.....	....	400	11	....	.....	.....
Total.....	207	628	605	1,807	840	35,074	1,722	528	1,688	35,882

INSTRUCTIONS IN CREAMERIES, 1907.

There were in operation this year 73 creameries. These were all visited regularly by the Instructors. Six creameries closed this year.

Two hundred and thirty-three full visits were made, and 62 call visits, making 295 total visits; 157 patrons were visited. This seemed to be all that could be reached this year on account of the large territory covered by the Instructors.

Sixty creameries are cream-gathered; 4 separator, and 9 both cream-gathered and separator; 59 creameries are now using the Babcock test; only 14 creameries are still using the oil test; 4 creameries are weighing the cream sample for Babcock test. This, I think, should be encouraged, for I believe the patrons are better satisfied. Besides it is the most correct method where thick and thin cream and sweet and sour cream is received.

Sixty-six creameries are using combined churns, only seven using box churns; 7 are using a pasteurizer. I think it is a mistake not to increase the use of the pasteurizer. Fifty-four creameries are collecting cream in cans; 19 creameries are still using cream tanks; 12 are using culture; 2 cream culture; 7 skim milk; and three whole milk; 25 are using a cooler. It will pay to use a cooler, 33 have good cold storage; 22 very fair; 11 fair; 3 poor; 4 none.

Two hundred and sixty tests were made for moisture by the beaker method. These were all duplicated, only 14 samples showing over 16 per cent. of moisture. Those showing over 16 per cent. moisture were churned and washed at higher temperature than ordinary. The average moisture content was 14 per cent. Owing to some difficulty in getting suitable scales for weighing the samples of butter for testing, it was rather late in the season before tests could be made. Further work will be done along this line next year, as it is giving us some valuable information. The Instructors report improvements in the matter of floors, drains, utensils, and inside and outside appearances.

CREAMERY INSTRUCTION, 1907.

—	Western and Southern.	Eastern and Northern.	Total.
	Fred Dean, Instructor.	Mac Robertson, Instructor.	
Creameries	37	36	73
Full day visits	133	100	233
Call visits	25	37	62
Total times at creamery	158	137	295
Patrons visited	47	110	157
No. of separator creameries	2	2	4
No. of cream gathered creameries	28	32	60
No. of both combined	7	2	9
No. using Babcock test	34	25	59
No. using oil test	2	12	14
No. of creameries using box churn	3	4	7
No. using combined churn	34	32	66
Tests made for moisture	181	79	260
No. of samples showing more than 16 per cent. moisture	11	3	14
No. using a pasteurizer	7	..	7
No. using cans for collecting cream	37	17	54
No. using tanks for collecting cream	..	19	19
No. using a cooler	13	11	24
No. using a culture	10	2	12
Expenditure	$8,875	$8,079	$16,954

The following creamery improvements are reported:

11 repaired.
6 put in new refrigerators.
15 painted either inside or outside.
14 put in new floors.
4 remodeled.
5 built new.
12 repaired floors.
2 removed hogs and built new pens.
4 built new ice house.
3 drilled new wells.
11 put in new churns.
8 put in new cream vats.
3 put in new drains.
15 put in new engines, coolers, boilers, water tanks, and so on.

A total expenditure of creamery improvements	$16,954
Cheese factories improvements	35,882
Total expenditure for 1907	$52,836

I would strongly recommend our creamerymen to pay more attention to cold storage, the use of coolers for cooling the cream as a means of saving ice, and more quickly getting the cream to low temperatures, thus checking the rapid development of acid and other flavors. Also a more frequent collection of cream, and a determined effort to secure richer cream, thus saving in loss in the buttermilk, and being able to churn at lower temperature. It is true that a great deal of our butter has this year gone into local markets, but still we must remember that considerable butter is exported, and that quality counts no matter where it may be consumed. There did not seem to be so much complaint regarding mottled butter this year.

I wish to thank the creamery instructors for the efficient way in which they carried on the work, and also the creamerymen and buttermakers for their hearty co-operation.

THE PREPARATION AND CARE OF CULTURE.

By E. N. Hart, Ingersoll.

The paper I have been asked to read before our Dairymen's Convention deals with the question of cultures; not particularly with the making of them but the care they should receive when properly made; also touching briefly on a few of the mistakes which occur in different factories of Western Ontario.

I consider it a great honor to be asked to prepare this paper for our Convention. I am dealing with a very important branch of our great industry, and I have to thank all the Instructors for the valuable information they sent me, for I thought it necessary to collect some of the different methods used in the factories and by different makers.

In the first place let us ask ourselves why do we use cultures or starters? Are they necessary for one purpose only, to hasten the ripening of milk when not at high enough acidity?

We as cheesemakers in Western Ontario must bear in mind that when we use a culture or starter in a quantity of milk it not only hastens the ripening of that milk, but the flavor of the cheese or butter made from that milk will depend somewhat on the flavor of the culture or starter used.

Let us look back to the history of starters, and we will find they were used in the dairy industry a great many years ago. The fact that starters helped in the manufacture of dairy products were recognised years ago by practical men, even before scientists recommended the use of pure cultures. The introduction of pure cultures only dates back to 1890, and were recommended by Prof. Storch, who urged their use in creameries in Denmark. In speaking about the different kinds of starters we might classify them under two names 1st, natural; 2nd, commercial.

To Prepare a Natural Starter. I would suggest the selection of a number of different samples of best milk coming into the factory; put into sterile glass jars and allow the samples to stand until sour, at a temperature of about 70 degrees F. The sample which coagulates into a smooth uniform curd, and has a pleasant acid taste and smell, is the one I would use as a mother starter.

I would advise makers not to bother with natural starters. By this statement I do not condemn a natural starter, for I believe that good starters have been made from a natural mother culture, but I think the best results are obtained from commercial cultures. By following the directions sent out with the pure cultures we should be able to make a good, clean flavored starter. But here is where we begin our mistakes. We assume all commercial cultures are found pure, and contain organisms suitable for practical work in the dairy, and should produce a pleasant flavor and no gas; but we should remember that commercial cultures are liable to become contaminated if not used as soon as opened.

I think it essential to have a perfect system in preparing cultures. We should exercise care in the selection of cans, see that they are well made, that the seams are well soldered, and that they are provided with snug fitting lids. For general use in cheese factories I think the ordinary shot gun cans about 8 inches wide and 24 inches deep, holding about 50 lbs., answer the purpose very well, and would recommend their use in preference to a larger can, as the milk is easier heated and cooled when in small quantities. I think more care should be given to the cleaning and scalding of cans in which the starter is kept from day to day, and the use of a stick or paddle or a common dipper for stirring the milk should be discarded, and replaced with a small wire handled dipper, to be used for nothing else. My reason for condemning the stick or paddle is that the wood becomes more or less saturated, and the cream gathers upon the upper end and perhaps not thoroughly scalded before using next day. The common dipper very often gets broken about the handle, and is one of the worst scources of contamination. I think too much care cannot be exercised in the selection of the milk at the weigh porch; also a curd test should be made frequently of the milk you select. Last season I made a number of curd tests of the milk that was selected by different makers for their cultures. Some of the samples were quite off in flavor; another very gassy, and another floated in one hour. I think by selecting the mornings's milk it will generally give best results.

In heating the milk for cultures some of the makers use a large milk can and turn a live steam pipe into the milk direct from their boiler, and claim good results. I am of opinion that this method cannot be discarded too soon, except where there is no other means of pasteurizing. Do not use boiler compounds, for where boiler compounds are used the water is not any too pure. It looks to me like a step in the wrong direction.

Mistakes are very often made in taking too long a time to heat up the milk. The cans are placed into a tank or barrel, and the steam is turned on, and let boil for several hours without stirring, which often gives the milk a burnt flavor; also too long a time is taken to cool them back to 60 or 75 degrees, from 185 or 180 to 100 degrees. I do not think any serious trouble will start, but I am of the opinion that where cultures are left standing at a temperature anywhere from 100 to 70 degrees for a long time uncovered before being inoculated with the pure lactic acid germ, the undesirable germs have every chance for reproduction. If makers would provide themselves with a good pasteurizing box, and also with cans as previously described, and have the water heated somewhat before placing the cans of milk in the box, it would not take very much time for pasteurizing, and better results would be obtained. I have found that where the making of cultures involves a lot of time and work, it is often done in a very haphazard manner.

Good milk selected at the weigh porch, pasteurized to a temperature of 180 or 185 degrees, and cooled immediately to 65 to 70 degrees, should give us a medium to be ready for inoculation. As instructed by the direction sent

out with the cultures, we find it necessary to propagate the culture several times before using, and sometimes we find the starter with not the best of flavor and needing further propagating. A possible explanation is that each organism must become adapted to the medium in which it grows before it gives its characteristic odor or flavor in that medium. The cultures as sent contain the organisms in a more or less dormant condition. These organisms regain their vigor and increase their acid forming properties after several propagations.

I do not think any hard or fast rule can be laid down to the temperature or the amount of mother culture to be used. It will depend somewhat on the length of time from making till using, and the temperature at which it is held, but no more should be used than will give the desired acidity. By testing the acidity from day to day the maker will soon know how much mother culture to add to produce the amount of acid required when ready for use; but I would prefer using a little more mother culture and growing it at a low temperature than to use less culture and hold it at the higher temperature to ripen. I think you will get a smoother texture and better flavor, with less danger of over-ripening.

The acidity for a culture to have when ready for use might be discussed somewhat, and opinions vary considerably; but from the information received from the several districts in Western Ontario the acidity of cultures in the morning when ready for use vary from .6 to .9, and sometimes one per cent. I think we find that when a culture has from .65 to .75 and not over .80 it gives the best results.

We are reminded that the under-ripening of starters is just as important to guard against as over-ripening. Prof. McKay tells us that about the time milk begins to turn sour it has a rather disagreeable flavor, after more acid develops the undesirable flavor begins to disappear, and the milk gets a clean acid taste. An explanation is given by Prof. Storch, the well-known authority on cultures. He tells us that the disagreeable flavor is due to the action of undesirable organisms during the first souring stage, and as the souring progresses these germs are subdued and gradually crowded out by the desirable acid producing types.

Before using a starter I would remove one or two inches of milk from the surface of the can with a sterilized wire handle dipper, as the surface is liable to contamination from outside sources, and break up the remainder by stirring well in can. I think this the best time to take out a small quantity to propagate the culture for next day, too many cultures are left sitting around in cans, pails and dippers which become contaminated before using.

The only vessel that should be used to hold the culture for propagation should be a sterilized glass jar, kept air tight, and in a cool place. A very good plan practiced by some of the best makers is to keep out an extra sample, seal it air tight, and put it in a cool place. Should anything happen to your starter through the night by being upset or steam pipe bursting you always have another culture in good condition. I think a culture is in good condition when you open the can in the morning, and find the whole mass firmly coagulated, no liquid to be found on top, and having a mild acid flavor, pleasant to taste and smell.

In conclusion, let me say that these little oversights are generally the beginning of serious mistakes. The time has come when we must study our cultures more. To know what to do with them, and what they will do for you. If you get a good culture or a poor one, you must know just what you are handling, and what results you are going to get from the operation.

A culture properly prepared and cared for, and judiciously used has been found a benefit to the dairy industry.

A MODEL SITUATION FOR TAKING CARE OF MILK, AND WHAT CONSTITUTES A CLEAN FACTORY.

By James R. Burgess, Listowel.

These, perhaps, are two of the most important questions we have to contend with in the necessary improvements required to further improve the quality of Canadian cheese. The quality of the cheese made depends, largely, almost entirely on the quality of the milk delivered at our factories, at least at the majority of our factories in Western Ontario.

Therefore, where the most improvement is required is in the quality of the milk delivered. This can only be attained by more care and attention, and improving the situation for taking care of milk.

We find milk being cared for on the farm in a great many different ways. At some places there has been no provision made for cooling purposes; the milk is put into the can and gets no attention whatever.

Sometimes the cans and utensils, are not clean; there is no strainer used; the milk is left near the barnyard or hogpens, or on the milk stand by the road side.

Again we find the cans and utensils clean and bright, and the milk is supposed to be cooled by setting it in a tub, containing, perhaps half as much water as there is milk, and the water is never changed. This instead of improving the milk, improves the conditions for the growth of bacteria and bad flavors, because the water and the milk soon come to the same temperature and the high temperature is retained for a longer time than it would be if no water were used. When water is scarce the milk is sometimes left in the pails and stirred till cool; but it is impossible to get the temperature below that of the surrounding air, and this makes it impossible to have the milk in the best condition in hot weather without the use of water or ice. There is no advantage in dipping and airing milk over stirring it, but it is a disadvantage when the surrounding air is not pure.

Leaving the milk at high temperature in places where the surroundings are untidy and impure is the most common cause of milk being tainted and over-ripe.

Sometimes the milk is cooled by using creamery cans filled with ice, and set in the can, but when left the milk farthest away from the ice would become warm more quickly than if it was surrounded by water or ice.

Milk is also cooled by setting in creamery cans, or pails, in a tank of cold water, before putting it into the large can. This method is all right where the milk supply is small, but where there is a large quantity of milk it would make too much work.

When a running stream of spring water is near by, a good place for cooling milk can be arranged by having a box or tank placed in the stream, and a house built over it. This saves the labor of pumping, and there is always fresh cold water around the milk.

There are different methods of cooling and caring for milk, which give good results; but what every patron should have is the best, most convenient, and practical way.

In speaking of a model situation for taking care of milk, we must first consider the main points that govern the keeping qualities of milk. The cows should be healthy, have free access to salt, plenty of pure water and good pasture. Cleanliness where the milking is done is essential; and also of the person milking.

The strainers, cans, pails, and all utensils should be thoroughly clean and bright, free from rust and dirt in any shape.

As soon as the milking is done, it should be taken out of the stable or milking yard to a place where the air is pure and be strained and cooled as quickly as possible to a temperature of from 55 to 60 degrees, always using a thermometer to determine the temperature. There should be plenty of pure cold water and ice, available; by the use of ice the cooling can be hastened, and the amount of water required lessened.

A milk house is required. It should be a good distance from the barn-yard, or where the surroundings are impure, and should be kept clean and tidy. For the purpose of cooling the milk, there should be a tank made of wood or cement, large and deep enough to allow the cans to be set in, and to hold enough water to come above where the milk comes to, and a space of three or four inches around the sides. There should be an outlet pipe near the top to allow the water as it becomes warm to be carried into the watering trough, and also one at the bottom to empty it occasionally.

If a windmill is used for pumping, it is well to have a large supply tank and piping to carry the water from it to the small tank. If there is no windmill, the milk house and tank should be near the well. A windlass is convenient for raising and lowering the cans out of and into the tank.

It is convenient to have a car or truck and a track laid from the tank to the milk stand. Sometimes the milk house is built close to the barn or stable, but if it is away from impure surroundings there is less danger of the milk being contaminated. The cost of providing a tank and milk house properly and conventiently constructed, on every patron's farm would be small, compared with the amount of money that is lost during the warm weather by milk being over-ripe and tainted, causing an inferior quality of cheese to be made, besides taking more milk per lb. of cheese.

It is impossible to get the best results, either in the quality of the cheese or the amount made, unless the milk is kept clean, sweet and cool; and in order that a cheese maker can expect and demand milk delivered at his factory in sweet, clean conditions, it is essential that the factory be kept clean and tidy. And not only for this reason, but because he will have more influence with his patrons, as it sets them a good example; it makes his work easier, and it is necessary in order to manufacture the finest quality of cheese and finish it with the clean tidy appearance it should have.

What constitutes a clean factory is not only the make-room walls, floor, vats, and larger utensils, but it is everything, from the largest to the smallest in and about the boiler-house, make-room, press room, curing room and surroundings of the factory, including the manager and employees.

The boiler, engine and boiler-house should be kept as clean and neat as any other room. It can be done if the boiler, engine and piping is blackened with lamp black, linseed oil and turpentine; or painted; the walls and ceiling whitewashed or painted; some shelves or nails put up to keep the tools on, and kept there when not in use.

The valves and unions should be kept packed to prevent waste of fuel, wet floors, and the room from being full of steam. The floor should be swept or scrubbed daily. The wood neatly piled and where coal is used, the dust can be kept down by keeping it damp.

The make-room walls and ceilings should be whitewashed or painted. The sinks, press, vats, and pan bottoms should be painted, and all piping should be painted with aluminum, which tends to brighten the room. The windows should be thoroughly and regularly washed; The weigh can, scales, porch, conductors, strainers and every utensil as soon as possible after being

used should be thoroughly washed and scalded and put in its place. In a cheese factory there should be a place for everything, and everything kept in its place when not in use. A room does not look clean and tidy if the floors are wet. Keep the floors dry, and do not try to change a strainer from one vat to another, when half full of milk. If a strainer made of perforated tin or fine wire fastened on a rack, is used, and a piece of cheese cloth laid over it, the cloth can be lifted off and put into a pail and rinsed out in a very short time, and then be changed without spilling any milk. Do not allow the whey to run over the floor, when running down a vat or after dipping. By the use of whey boxes made of tin or wood this can be prevented.

At dipping use a conductor or whey box to carry the whey from the end of the sink to the gutter, and the use of a dipping board to rest on the end of the vat and side of the sink to prevent the curd from being spilt on the floor is preferable to a cloth.

The vats after dipping, when washed and scalded should be wiped around the outside with a damp cloth every day.

The press and hoops should be washed and scalded every day; also the sinks. The sink cloths should be wrung out and shaken, and not be left to soak in whey every night, unless there are two sets of cloths. When there is only one set, and put in whey every night, they do not get a chance to be properly aired and get a heavy whey smell, which sometimes develops in the cheese.

The gutters should be scrubbed down every day. The bandagers or fillers should be as thoroughly washed as any other utensil.

Flowers in the windows of the make room give the factory a more attractive appearance.

Have a system of doing your work, and your factory will look tidy and your work be easier. Keep out the flies by the use of screen doors and windows and cleanliness.

The cleaner the factory and surroundings are kept the fewer flies there will be around.

The curing room walls and ceiling should be painted or whitewashed, the windows, shelves and floor clean and the room well aired. There should be nothing but cheese kept in the curing room. If there are cap cloths or bandage cotton it should be kept neat and tidy. Do not use the curing room to keep empty boxes in or for a pantry or truck room.

After every shipment of cheese the shelves should be wiped with a damp cloth or scrubbed, depending on the length of time the cheese have been in and the condition of the shelves. The floor also should be scrubbed and kept clean, and the cheese, clean and neat, be placed evenly on the shelves gives the room a better appearance.

The factory should have a neat, tidy appearance from the outside. This cannot be done without the surroundings being tidy and clean. The wood being neatly piled, chips raked up, and all rubbish, such as boxes, barrels, hoops, etc., put out of sight.

The whey tanks should be kept clean and sweet both inside and out, and free from that strong, sour whey smell that they acquire from not being cleaned and allowing the whey to be spilled or leak out and putrefy. The tanks should be thoroughly cleaned at least once a week.

The cheese-maker and men should wear aprons and keep them clean. If the factory and utensils are kept clean and tidy, the men's clothes do not get dirty so quickly, and there is more pleasure and comfort in doing the work.

A man who does not keep himself clean, does not keep a clean factory; neither does a man who does not keep a clean factory keep himself clean.

The best results are not obtainable without clean and sanitary conditions at the farm, and also at the factory.

PRACTICAL CHEESE-MAKING.

By Alex. McKay, St. Marys.

In taking up this subject of cheese-making I find it very difficult to bring out anything new, or that will be of interest, as there has been so much said and written on the question of the making of cheese. But mentioning a few of the difficulties which we have met during the past season, their apparent causes, and how to overcome them, may bring out a discussion which may be of some interest.

You will all agree with me when I say that without a clean, sweet milk supply it is impossible to make the finest cheese. To my mind the most difficult task before us to-day is to get the average patron to realize his individual responsibility; or, in other words, to see to what extent he has the control of his profits in milk production. He is the only real producer of wealth in the trade, and his profit depends to a very great extent on the quality of the raw material furnished by him. One thing which struck me very forcibly the past summer as I visited the farms was the number of very poorly constructed stables, some of them totally unfit for the housing of cattle, as they were dark, and with no provision made for ventilation. As the cows spend almost one-half of their time in the stables, we cannot expect to have healthy animals unless we provide suitable stables. It will be very hard for me to say what percentage of the stables are in this condition, as I only visited places where I found the milk as it was delivered at the factory to be of inferior quality; but we can never hope to have a first-class milk supply so long as those conditions exist to the extent to which they do. Still another hindrance is the lack of proper cooling of the milk, and of suitable utensils, together with the proper care of the same.

It appears to be very hard to impress upon the average producer the necessity for cooling his milk. So long as it is accepted at the factory he is loth to put any extra labor on it, but if we are going to have milk delivered as it should be, it is necessary that it should be cooled immediately after being drawn from the cow to a temperature of at least 60 degrees. We are not able definitely to say how this should be done, as each patron has not the same conveniences for doing the work; but the most effective way is to have the cans placed in a tank containing cold water and ice, and to have the milk strained into the cans as it is drawn from the cow.

Now a word about the care of the utensils. I must say that in the last few years there has been very marked improvement in the cans sent to the factories; but still we have flavors that can be traced to the cans. This shows that the care of the milk can is still a vexed question. The milk producer is not altogether at fault, as I consider that the patrons are not treated fairly in the matter of the whey returned from the factories in the milk cans, when they are asked to keep them clean after the stuff that has been put into them from some of the whey tanks of this country. I think it is high time that there was something done to ensure the return of clean, sweet whey if we are going to have it returned at all. This can only be done

by having the whey heated and the tanks washed every day. Then we will be reasonably sure that we are not distributing bad flavors through the medium of the whey, but will be co-operating to some extent with the patron in this great fight for clean, sweet milk for cheese-making, without which our progress will be very slow indeed.

Now just a word as to how to remedy the conditions of which I have been speaking. To my mind the only solution is to classify the milk. But the great question is how to do this. We all know that it is impossible for the cheese-maker to do this. However, there is another way which I think would work out quite effectively, and that is to inspect the premises of the milk producer, and if it is not found to be in a first-class sanitary condition, with provision made for cooling the milk, then place him in whatever class he may belong, and report to the cheese-maker, and let him keep him in that class until such time as the necessary improvements were made. By adopting this method, the good patron would simply be getting his own and not be compelled to help the fellow who will not help himself.

Now we come to the part of making the cheese. In the first place, I would like to mention one of the difficulties which we met during the past two seasons. This was cheese with a great many small round holes similar to gas holes, and to all appearances cut with acid. This occured in hot weather, when we were receiving a lot of over-ripe milk; and at first sight was rather difficult to account for. These conditions may be caused by moisture being left in the curd at some stage. When this is the cause, it is very hard to fully overcome the condition later on in the process. The first thing done was to set as sweet as possible, using a little more rennet, thus shortening the time required for coagulation, and then cutting finer. "But," you say, "that fine cutting increases the loss in the whey." I quite agree with you if the cutting is done with the ordinary knife; by using it several times we are not able to get the curd uniform, and there is a danger of losing the smaller particles. But to overcome this difficulty, we have a new quarter-inch wire knife made which leaves the curd uniformly small, and causes no greater waste than does the ordinary knife. I might say that we tested this thoroughly at the Dairy School last winter, and found practically no difference in loss between the two knives, and would strongly advise the use of the smaller knife where over-ripe or bitter milk is to be made up, as it leaves the curd in much better condition, and only requires to be cut three times, thus leaving the curd uniformly small so that the heat can be applied much more quickly, with less danger of breaking the cubes and causing a waste and roughness in texture.

We must always bear in mind that it is the heat in conjunction with the development of acid and action of rennet that shrinks the curd and expels the moisture. Then, if we are to have the very best results, we must study to keep those factors in the proper proportion, as an excess of any one of the three has its evil effect. If we are dealing with over-ripe milk, which means milk with the acid out of proportion with the other contracting agents, we must make conditions favorable for bringing about normal conditions as soon as possible. This can only be done by cutting finer, so as to allow for the contraction to take place in a shorter time, as we must, if possible, get the moisture properly adjusted in the curd, or cooked or firmed or any other term you may like to use; as, after all, the whole secret is to get the moisture and acid in the proper proportions before removing the curd from the whey or before the dipping point is reached. It is very hard to give any definite point where the dipping should be done. The only rule is to give sufficient acid so that the curd will mature in a reasonable time and give a reasonably close body, but not so much that it will prevent

the moisture leaving the curd quite freely. I consider that the amount of acid at dipping determines to a very great extent the percentage of moisture retained in the cheese. For example: You have noticed a curd after dipping appear to be very hard—too dry. This is caused (if the curd is properly firmed) by allowing too much acid to develop before dipping. The curd has come to that stage where it is shrinking very rapidly, due to the amount of acid developed, and expelling the moisture at the same rapid rate, and the mere fact of not being able to get the moisture away from the curd as fast as it is being expelled allows it to mat and incorporate the moisture in the mass, thereby defeating the object which was had in view, namely a proper adjustment of the moisture in the curd and cheese; and then it is impossible to get rid of this surplus moisture at as little expense as you would have been able to do if the curd had been dipped with less acid. This is one of the greatest causes of dry, hard, and rough textured cheese, as we have made the mistake of getting our contracting agents out of proportion. I would like to impress on all cheese-makers the necessity of keeping up this natural fermentation and contraction of the curd, as you see here that the slightest mistake has the very opposite effect of that for which you are working.

Now, a word about stirring in the curd sink. Did you ever stop to think what moisture you were getting out in the process of stirring? For instance: If it were possible to take from the vat each particle of the curd separately, and dry off the surface, you would then have sufficient moisture left in the curd, and more than you are able to retain in the cheese, as you have not yet got those cubes as firm as cheese should be. Therefore you can plainly see that it is only the free moisture, or the moisture surrounding the cubes of curd that you are able to stir out, with the exception of the small amount of moisture that is expelled by the natural contraction of the curd due to the development of acid; and if the curd is sufficiently firm to stand the stirring properly, we have a continuation of the natural fermentation and expulsion of moisture with the least possible loss. To my mind there are more mistakes made from not stirring dry enough than from stirring too dry, provided the curd is in proper condition at this stage. As I said before we do not take the moisture out of the cubes of curd, but simply allow the free moisture to escape.

I am not in favor of rough handling of the curd at this stage, or in fact at any other stage, as rough handling tends to break the cubes and causes a needless waste; but the curd should simply be kept in a loose, open condition a sufficient length of time to allow the free moisture to escape, and not long enough to prevent it matting well. If this is not done, when the curd mats it is again incorporated and held till the curd is milled, and runs off in the form of white whey causing a very much greater waste than if it was properly dried.

There should be very little moisture run from the curd after milling as this is always attended by a much greater loss of both quantity and quality than is the case where the moisture is properly adjusted by the use of the agents which I have already mentioned, namely, development of acid in conjunction with heat and rennet action, and proper stirring at the time of dipping.

I would like to impress on the cheese-maker the necessity of training to exactness all along the line, and in conclusion would say that the man who makes his cheese the closest to the sweet line at all stages is the man who is the most successful and scientific cheese-maker, as he gets the finest quality and the greatest quantity from the raw material furnished him, which after all are the essentials in successful cheese-making.

HANDLING OUR CHEESE AND BUTTER AT THE PORT OF MONTREAL.

By George H. Barr, Dairy Division, Ottawa.

In Mr. McKay's paper he gave me the secret of his great success in making cheese. That is to have the curds properly cooked, and not to leave too much moisture. If there is any one thing that is hindering our cheese trade to-day it is leaving too much moisture in the curd or improperly cooking the curd. That is very prevalent in the far Eastern part of Ontario and in some sections in Quebec. Now I would say that although we have things in pretty good shape in Western Ontario, down in Montreal we find that there is a tremendous lot of work to do in Ontario and Quebec before we have all our cheese of the finest grade. You do not know anything about it here. I am not sorry that I have left Western Ontario, because after all you are only getting the price of our average Canadian cheese, and if we have a whole lot of second grade cheese, and a considerable number of third grade cheese, you are suffering; and if I can do anything that will help to raise the standard of the cheese in these districts I think I will be helping you in Western Ontario. My talk to-day is on the handling of our goods in Montreal. I want you to distinctly understand that I do not know all about Montreal, and I do not know all about the cheese trade or the butter trade. I do not know anybody in Canada who does. I know more about it than I did a year ago. I felt when I was coming back here to Western Ontario that I could not say very much to you here, even in connection with the handling of cheese in Montreal because I did not see many western cheese. My work as official referee brought me more in touch with the cheese from the Eastern part of Ontario, and principally from Quebec.

Mr. Barr then delivered a similar address to that given at Picton a week earlier, and reported in the proceedings of the Eastern Association, and continued:

Mr. Ruddick showed you the pictures last night and he said our competitors will be Irish and Siberian. We think we are an excellent dairy country, but when you look at that picture of Siberian butter and see that it was put up as well as any butter could be put up as far as the making of it was concerned, you will come to the conclusion that they are competitors with us; and that means that in Canada to-day if we are going to compete against them we must put the very best skill in at the manufacturing of butter or we will not be able to compete with these people. Do not think that because I have stated some nice things about your cheese that there is nothing more for you to do. I saw some cheese in Western Ontario last year that I was not proud of, and I felt ashamed that they came from Western Ontario. You are still making some inferior cheese here, and some inferior butter, and it is up to you, as cheese-makers and as milk producers, to see that the percentage of inferior goods from Western Ontario is cut down to a very small limit. You are doing well. I recognize that more now than ever, but at the same time you are not doing as well as you could do, and it simply means that you have to put all the skill you have into your work; and if you do that then you will still continue to lead in the manufacture of cheese.

I want to make one appeal to you: Don't build any more small factories. If you went down to Quebec and Eastern Ontario you would get some idea what it is to have small factories. Now I say, and I mean it, that

if you are wise, and have your own interests and the interests of the dairy industry at heart, you will not build any more small factories in Western Ontario.

The reporters at Picton unfortunately reported me as saying that there was only two per cent. of the cheese that came into Montreal that could be passed at finest. I want all reporters here to contradict that, because I did not say it. I would be a little afraid to go to Montreal to-day, because that is not right. What I did say at Picton was, that I go through the number of cheese in each lot, or the percentage of cheese in each lot containing 100 boxes, and seventy boxes, and forty boxes. As far as I can remember there was only 6½ per cent. of the lots examined there that contained over 100 boxes. About 93 per cent. of the lots I examined contained less than 100 boxes, and I think it was 83 per cent. contained less than 70 boxes, and nearly 50 per cent. contained less than 40 boxes. What I did say was that these lots contained, generally, about a week's cheese, and when we remember that about 98 per cent. of the cheese I examined were under the first lot, I said it was easy to see that the majority of our inferior cheese came from small factories. I hope the reporters will correct that statement, for those cheese I am called on to inspect are usually cheese that have been either rejected or suspected by buyers. I am sorry indeed that it has been published, because I only saw a very small percentage of the cheese at all, in Montreal. What I wanted to say was that nearly all the cheese I saw, or was called on to examine as official referee, were from small factories, and for that reason I want to say that the small factories have a great deal to do with our inferior cheese in Canada. I do not want to say that a good cheese cannot be made in a small factory, but when you have a small factory you cannot get the best men to make cheese in them. If we are going to have nothing but the finest cheese in Canada we must have large factories with the very best and strongest and most capable men. If you are going to keep up the reputation in Western Ontario—and you are keeping it up because you have splendid men in the factories, and they are large faoctories—then you must keep on progressing.

A word about inspecting cheese in the warehouses. The cheese are delivered to the warehouses by the dairy transportation companies, and the different ways of inspecting the cheese is this: In some of the warehouses the first five boxes are taken off the dray and set aside, and the whole lot is judged from the five boxes, when the rest of the cheese are immediately wheeled into the cool-room, where the temperature is kept at about 45 degrees. In some warehouses the cheese are put into the cool-room and piled up in different sections, and the examination is made there, inspecting three or five or ten boxes. So now you can readily see that batches of bad cheese will slip through, and you are also liable to get one of the bad batches for inspection, and the whole lot is liable to be condemned on that account. One of the worst features of the inspection is that you cannot get an accurate test of a lot of cheese.

The weighing of cheese in Montreal is something we hear a great deal about. I had an opportunity of seeing the weighing done in the weigh-houses, and as far as I can see it is done fairly and accurately. Three or four gangs of men, three in a gang are employed, carrying their scales with them and weigh their cheese in the weigh houses. They weigh from five to ten per cent. of the cheese and butter in each lot, and the whole lot is averaged on that bases. I think you are well off in Western Ontario, in that you are having your weights inspected in the cars here, and you can have the inspection done on the shelves in your factories. In my work of

inspection I run across some rather peculiar specimens of the human race, and some rather amusing ones. Unfortunately I cannot speak French, and a lot of the cheese I examine are from Quebec, and very often the cheese-maker is present. At one lot I examined the maker could not speak English, and I had to have an interpreter. I bored the first cheese and I said to the man "That is very open cheese," and I got back the answer, "That could not be so, because he was there till six o'clock every night." The next cheese I examined was gassy and had pin holes in it, and I said "This is open and gassy," and the answer came back, "Never had any gassy milk, and there could not be any gas in the cheese." The next one was very acidy and had a rough texture, and I said "There is far too much acid here," and he said "It cannot be that, because I never got any very ripe milk, and never set it very ripe." and the interpreter said, "He has got an excuse for everything," you cannot do anything with him."

I want to give you one receipt I ran across for food flavors. I was told this by a man who had spent some time in Quebec. This dairyman had quite a bit of trouble one spring with leeks, and the milk was returned three or four different times. It came all right for a day or two and then he found it was falling off in quantity each day. Some days he would send 120 pounds, other days 150 pounds. The maker met this patron on the road, and he said to him "Why is it that your milk is falling off so much in weight?" "Well," he said, "I will tell you, I came to the conclusion that cows are a good deal like people: some people cannot eat onions and others can, and I came to the conclusion some of these cows would not eat leeks and some of them would, and I thought I could fix that all right: so each night when the cows come up to be milked, and before I milked them, I go around and smell the breath of each cow, and I keep the milk of the ones that smell of leeks, and the milk of the ones that don't smell of leeks I send to the factory. (Applause.)

THE PRODUCERS' SIDE OF THE CREAM GATHERING SYSTEM.

By Mack Robertson, St. Marys.

Anything that may be said along this wide and varied subject must necessarily be in the form of a short criticism of the present methods by which this end of the business is carried on, and some few suggestions as to how the present conditions can be improved upon. I am sure no one will dispute the fact, that there is plenty of room for criticism. Improvement along this end of the industry is one of the most necessary things in the creamery business? Perhaps, no branch of our buttermaking system is carried on with such lack of business methods and knowledge. True, we are glad that we have some exceptions, but the exceptions are greatly in the minority class.

As I pass along I would like to say a few words about the cows kept by the cream producers. The cows represent, and are the support of our whole dairy industry, and yet, it is true that the great majority of cream or milk producers give this important question no intelligent thought or consideration from a dairy point of view. Many producers may size up their herd from the point of good-looking cows; but, few size them up from the point of a good-working cow—that is from what they can do at the pail. If producers would take hold of this question, I feel sure that the quantity

of milk or cream supplied to our creameries could be more than doubled in a very few years with the same number of cows. Producers must learn to study each individual cow, to weigh her milk at each milking, find out what she is doing for him each day, each month and each year, and, by the use of the Babcock test, know exactly how many pounds of butter fat each cow is supplying him with. Thus, by knowing what a cow is yielding in butter fat for the time and feed spent on her, will the producer know whether she is a profitable animal or not. I fully believe that one-half the cows kept by our producers are not paying for the cost of their keep, and wherein is the profit in cows like these?

Again, our cows are not the only ones to blame. Some producers have good cows, but they cannot give milk without getting good food. The season just past has illustrated, at very great cost to the producers, how very necessary it is to make provision for just such dry seasons, by having a green crop such as corn or some green fodder to feed the cows in the dry season. A little forethought and good management would provide this crop, and if it were not needed it would still be profitable as fall or winter food. There is also great need for more silos for winter feeding, and especially is this true in the northern part of Western Ontario, where little or no provision is made for winter feeding. Many of our producers still persist in feeding turnips. This practice should be discountenanced altogether. No matter how carefully they feed them, some one is sure to overdo it, and the quality of the butter is spoilt, which means loss of money for the producer.

In milking and separating the cream there is room for more cleanliness and care. Cows should be kept clean and in clean places. The milker should be clean, both hands and clothes, and be careful to wipe off the cow's udder before starting to milk, and always milking with dry hands. In regard to the separators and separating, if we were to take a trip through some of our cream producing sections we would find separators sitting every place imaginable from hog pens to the kitchen. Some are in clean places and kept clean, being washed and aired every time they are used, while others are in filthy places and covered with dirt and filth and are only washed once per day. This is not as it should be, separators should be provided with a suitable building where the cream could be separated in clean, pure atmosphere, and the machine itself kept clean. Also there is need for better operation of the separators. Too much thin, sour cream is being supplied to our creameries, which is an injury to the quality of the butter made. A richer cream should be skimmed, as this cream would keep better, would be a less amount to cool, less load for the drawer, and less bulk for the buttermaker to handle, and the better quality of cream supplied would ensure better butter and better financial returns for the patrons.

One more very important point is the need of better cooling facilities. In speaking to a cream producer last week regarding the necessity of putting in a supply of ice for cooling his cream, he said that he only bought his separator so that he would be rid of the necessity of supplying ice. This, I know, is the erroneous idea of many of our cream producers. If they have a separator they think they have no more use for ice; they forget that it is necessary to cool the cream as well as to separate it. A greater mistake was never made, and it is a regrettable fact that the quality of cream supplied to our creameries has deteriorated since the hand separator has come into general use. This is not the fault of the separator, but the fault of the man who is using it. Ice in plenty should be supplied for cooling the cream, and the cost would be very little considering the benefit derived from its use.

In conclusion I would like to say that each buttermaker or creamery company must do more outside work amongst their patrons. Many patrons

or producers are willing enough to do better if some one will only take interest enough in them to show them how and why. It will pay every creamery company or private owner to hire the buttermaker to start work one month before the creamery opens in the spring, and keep him out amongst the producers canvassing for cream, explaining the test, the methods of doing business and giving patrons instruction in skimming and caring for their cream. This work is sadly neglected, and yet, it would be a business proposition for the creamery, because the increased patronage and increased quality of cream supplied would more than pay for the buttermaker's extra wages. At many creameries none of this work is done, and no work would pay better. Patrons would then know the maker, and would be able to go to him for advice and the better quality of cream supplied, and increased patronage would more than pay for the labor and expense. Creamerymen must do this work if they ever expect conditions to improve above their present standard; and it is the creameries which are doing this work that are going to thrive and live.

CREAMERY SYSTEMS IN WESTERN ONTARIO, PAST AND PRESENT.

By Fred Dean, St. Marys.

In comparing the advancement which creameries have made during the past thirty years, as to conditions generally, we find that there has not been so much improvement as one would expect.

About the year 1878, there were a number of creameries started in the Northern district of Ontario at St. Jacobs, New Dundee, Ayton and Kirkton.

The method adopted at these creameries for paying the patrons consisted of the drawer calling each day at the different patrons' farms and skimming two milkings one day, and the patron skimming the next day, the cream being measured in shot gun or Cooley cans, there being no test. Each patron was paid alike according to the measurement and pounds of butter manufactured, after deducting five cents per pound for making. The cream was all gathered in wooden tanks and delivered sweet and clean flavored, owing to the cans holding the milk and cream being entirely under water and kept cold.

Old makers say that cream has never been delivered at the creameries in as good condition as when they first started to make butter, which does not speak very well for the present generation. In the year 1888, the first test was used for paying the patron according to the quality of the cream, called the Cherry Test, which consisted of a tin can the size of a quart sealer and a wooden shaker. A sample of each patron's cream was put in these tins and churned and when finished, the butter was weighed and the patrons paid accordingly. About the same time the Oil Test was first used, which consisted of small glass tubes holding a sample of each patron's cream taken, by the drawer, then churned, after which the amount of butter oil was read on a chart specially prepared. There are a few creameries using this test yet, but most of them have been superseded by the Babcock Test.

The first churns were barrel shaped with an up-right dasher, holding about 25 gallons of cream; these were used until 1884, when the box churn came into use. About 1898, the combined churns gradually took the place of the box, until now few creameries are without them. The workers used in conjunction with the dasher churns, were large wooden bowls for washing

the butter. It was then salted on a triangular worker, partly worked, and left over night before finishing working. For the box churn, the Mason, Fargo and National workers were used.

About 1890, a few of the cheese factories began what was called the Separator System, in the fall and winter months, taking in whole milk and running it through power separators, this being the commencement of the separator system in butter-making.

In 1893, Winchelsea started a whole milk or separator creamery; then in 1897, the St. Marys Creamery Co. established one of the largest separator creameries in Canada, running it as such until 1904, when the hand separator became the craze, compelling nearly all the separator creameries to change back to the cream-gathered system, much to the detriment of the quality of the butter, on account of the poor care given to the separator and cream, and the length of time kept before delivering at the creamery. The creameries have been steadily increasing in number under this system, until now only an odd cheese factory is found among the group of creameries in the creamery districts.

In Western Ontario the District is divided into two groups, North and South, with about 73 creameries, two of these being the only ones left where the whole milk is separated and no cream-gathered cream taken; five creameries separate whole milk and take in gathered cream; four make cheese and butter both in the summer; the remaining creameries being strictly cream gathered or creameries where cream is collected from the patrons who do their own skimming, some using the hand separator, others setting the milk in cans, crocks, pails and pans, allowing the milk to sour and then skim the cream off by hand.

In the Southern Group there are 41 creameries; 27 of these or 65 per cent. are in first-class condition, having good buildings, cement floors, drainage and water supply good, with walls and ceilings painted or whitewashed every year. The equipment and utensils are kept clean and up-to-date, the majority have good refrigerators kept at a low temperature. The sanitary conditions are good, with surroundings kept neat and clean. Most of them are well managed, having a good butter-maker and managers who know their business; they produce a good quality of butter, and as a general rule give satisfaction to patrons and buyers of the butter. A large improvement has been made in some of these during the past season. The one thing lacking is improvement in the poor grade of cream delivered; but as long as two or more waggons from different creameries are run over the same routes, and one drawer takes what the other refuses, or the same price is paid for sour or over-ripe cream as that paid for good, clean and wholesome cream, little will be accomplished in improving the quality, as it is not through ignorance that this injustice occurs.

Of the remaining 14 creameries, 7 of them, or 17 per cent. are in a fair condition: some of them have good buildings, but poorly equipped, and poorer utensils to work with, drainage and water supply not good, while a good many of them have old wooden floors, none of them kept any too clean.

The refrigerators are in poor condition, and the temperature varies, depending upon the humor of the maker, whether he feels like filling it with ice often or once per week. The quality of the butter is never even, and a good deal of dissatisfaction is felt between the maker and proprietor, also between them and the patrons. These creameries could be greatly improved, either by a change of proprietors or managers, and a little expense and manual labor, with a good willing, thrifty, and energetic maker.

The other seven should not be allowed to have butter made in them another year unless some improvements are made. The buildings are old

and unsanitary; they have poor drainage and bad water supply, most of the equipment is unfit for use, being old and never kept clean; the utensils are in the same condition, and not enough of them to do good work, even if the makers were inclined that way. Some of them are in barnyards and mud holes of the worst description. Some are old cheese factories that have outlived their usefulness in that line and have been made into creameries, while the stench of old whey soaked floors, tanks and surroundings can be detected long before they are reached. Some are in cellars, where the sun never gets a chance to show up their uncleanliness, and have a mouldy and close smell that makes it impossible to produce a good quality of butter, even if the cream was delivered in good condition. Lower prices are paid for butter at some of these creameries, and the quantity in some cases is greater than in the case of the better ones.

We are all aware of the fact that there are a good many things to be learned about butter-making and creamery management, to make a success of them. Therefore, to have a successful and well managed creamery, we must have at the head a butter-maker who has a thorough knowledge of, and who is interested in his work, ready and willing to learn and try anything new that will lead to the advancement and progress of the business and to realize that the interest of his employer, patron and creamery are bound together, and he needs to have tact and good judgment enough to know how to keep everything running smoothly and in harmony one with the other. The art of knowing how to get on well with the patrons is an accomplishment which every maker will find to be an invaluable asset. Few makers pay any attention to this part of the work, consequently they and the patron drift apart, each one trying to get all they can out of the other, instead of doing all they can to build up the central interest that they both belong to. "*Knowledge gives confidence, ignorance breeds suspicion*," is truer in the dairy business than in any other line of business.

Monthly statements are sent to the patrons from some of our creameries that should not be tolerated. All that is given is the pounds of cream sent, pounds of fat, and cheque. No test given, nor pounds of butter from the cream sent, no price for which such butter is sold, etc. No annual or patrons' meetings are held to show the amount of business done or other transactions.

It is along these lines that a maker can make or break a creamery business. He should know each day what he is doing by keeping a careful record of the weight, tests, and condition of each patron's cream; also a record of his work, as to the total amount of cream, condition of cream at churning, the temperatures and acidity of it, from its arrival at the creamery until churned. If a poor grade of cream is received that could be improved by a little personal effort, that effort should be made. If there is some point about butter-making that is not clear, study it. We never get so near perfection that there is nothing more for us to learn, and after once getting a reputation it will be just as hard a fight to keep that reputation. It makes no difference how good a name a factory or maker has made, if the trade receives a few bad lots of butter from that factory, the name is gone, and the only way to be sure of getting the best price at all times is to have it always of the best quality.

It is generally conceded that a man who works in a position where intelligence and industry is needed will gradually fit himself to that position; but while at work at a trade where neither thought nor intelligence is needed, a man will gradually grow slow and dull, for the less he does the less he wants to do, until he finds himself incapable of performing any work right.

But we find men in the creamery business of all types. Some are clean, honest, skilful, painstaking and obliging, who command a good salary and are always sought after. Of these we have twenty-three men out of forty-one or 55 per cent., who understand their business, have had a good training and experience, before starting to manage a factory. Their personal appearance in most cases, corresponds with the appearance of their creamery; they are neat and tidy, and and keep everything about the creamery in sanitary condition. They take pride in their work, and are ever ready to learn and try anything that will improve the quality of the butter.

They experiment with the different suggestions given them, to find out for themselves the best methods of getting the cream cooled in a small space of time, the best temperatures to churn and wash at, to get quality and quantity.

Then we have ten men, or 24 per cent., who have had sufficient experience and education along the line of creamery management and butter making, who can make good butter and keep everything clean if they would try to do so, but become careless and indifferent, thinking anything is good enough so long as they get their time in, and get through with the work in some kind of way. This is especially the case if working in poorly equipped creameries. They cannot get the necessary supplies, or do not go the right way about it. No encouragement is given them from the owner or company to keep things in repair. They thus become careless and neglect doing their duty, overlook part of their work as to keeping pipes, floors, and utensils clean. The churn has a little warm water thrown in and a couple of revolutions given it, it is then called clean, until fault is found with the quality of butter. The churn is examined and yellow matter has been found from 1-16 to $\frac{1}{8}$ of an inch thick all over the inside. Vats are found nearly as bad, strong odors come from every direction.

The refrigerator is at a high temperature, and things generally are kept in a bad condition. It is a safe assertion to make with this class of butter-makers, that they injure more butter and do more injury to the creamery business by "A lack of disposition than from a lack of knowledge."

The remaining eight makers, or 19 per cent., (along with the poor creameries) should not be allowed in the business. They are a stumbling block and detriment to the advancement of the butter-makers and to the progress of the industry. They are often the cause of the better maker quitting the work, by offering to work cheaper, and give guarantees that no man knowing his business would think of doing, because he has no control over the conditions.

These makers have not had enough experience before starting out for themselves, or have worked under a man who has not been careful enough in giving them training along clean or methodical lines. Some of them have no liking for nor take any interest in their work, but do it until some job turns up that they think they will like better, or earn enough money to give them a good time, clothes, and three meals per day. Some of them have never attended a Dairy School, and those that have, did not take enough interest while there to put into practice the scientific or practical things taught them. They seldom read dairy papers or attend dairy meetings, and a lack of thorough understanding of the principles necessary in making a good uniform grade of butter.

To improve the quality and standard of our butter, the first thing to recognize is the real need for improvement. So many makers never see any butter but their own make, and it is impossible to convince them of the need of improvement. One of the best methods used for improvement of the butter in the cream-gathered creameries was carried on at some of the

creameries during the past season, where the pasteurizer was not used. The cream was cooled down to 50 or 52 degrees as quickly as possible, either by running it over a cooler or icing the vats thoroughly containing the cream, and churning within three or four hours after being delivered. This prevents the development of further acid and bad flavors, which is sure to take place if left over night, especially at a temperature of 54 to 60 degrees, which is the custom of a good many butter-makers.

The oily flavor that is found in so much of the cream-gathered butter is due to keeping the cream too long at, and churning at, a high temperature. When cream is cooled and churned at once this flavor is never noticed. It also helps to overcome the sour and rancid flavors due to old and over-ripe cream, by getting the cream into butter as soon as possible. By using the pasteurizer, the best all round satisfaction is given, especially if the cream is not too sour or over-ripe and testing over 25 per cent. fat. Where cream can be obtained under these conditions a pasteurizer certainly should be installed and used. A good culture is also essential, but owing to the difficulty of getting skim or whole milk, and the extra care that a cream culture takes, few of the makers use one continually. The cream in the vat should be stirred often to get an even temperature and acidity. If left without being stirred, the cream around and next to the cold water and ice will be colder, and thus develop less acid than the cream in the centre of the vat, which will be of a higher temperature, thus not giving an exhaustive churning.

The quality of the cream the past season has been quite an improvement over other years, showing better care as to cleanliness, and keeping the cream cool, but progess has been greatly impeded by a number of the factory owners having the cream hauled but twice per week, and in a few instances where extra care was taken of the cream only once per week. This should not be, and where the patrons are doing their part in taking good care of the cream the owner should not be so avaricious by taking advantage of this extra care to cutting down expenses and spoiling the quality of the butter.

In determining the amount of moisture in butter made by the different creameries the past season, the beaker method was used, and duplicate samples were taken in nearly every case. I made 187 tests which averaged 13.92 per cent. of moisture, 11 of these were over 16 per cent., highest 20.90 per cent., lowest 8.85 per cent. The temperature churned at, of those over 16 per cent. was from 52 to 54 degrees, and washed at 56 to 58 degrees; some of them were over churned in the buttermilk, and others allowed the granules to increase in size in the washing of the butter.

The butter that contained the high per cent. of moisture was of a dull color and had poor body and very open, though not as slushy as one would expect. The temperatures churned at by the majority of makers who had about the average test was from 50 to 52 degrees, to the size of wheat, spraying with cold water until the buttermilk was all expelled, and then washing once or twice according to the condition of the butter at a temperature of 52 to 56 degrees, until the granules were the size of corn. As soon as the butter was sufficiently drained and not too dry, one-half of the salt was sifted on as evenly as possible, the churn was then revolved without rollers a couple of revolutions and the remainder of salt added, with one or two more revolutions without rollers. The butter then should be worked four or six revolutions and allowed to stand and drain off surplus moisture for ten or fifteen minutes, finishing working with six to ten revolutions more depending upon the general conditions. No definite rule can be given for

working butter, it being a part of the butter-maker's trade, which is very important; yet a good many give it very little attention, doing it more by guess work, causing mottles, streaks, greasy and open butter.

THE BUTTER-MAKER'S WORK.

By E. H. Webster, Chief Dairy Division, Washington, D.C.

I think it would be out of place for me to try to express my gratitude that I have been able to come this year and attend your convention. It certainly has been a pleasure to me. I have met with people whom I had heard of for a good many years in the dairy business, but whom I never had the pleasure of seeing, and it is a very great pleasure to know that you have so vigorous and strong an Association in Western Ontario, and that you are pushing ahead.

We on the other side of the line look to the dairymen of Canada, and particularly of Ontario, as leaders in many lines of dairy work. We have a great many men on the other side of the line who come from this side. They received their training from Prof. Dean and other teachers at your dairy schools, and they are right good sort of fellows, and we appreciate them. We have lots for them to do, and I wish we could get a lot more of you down there, because we need lots of good help on that side of the line.

To-day I bring you cordial greetings from the butter-makers and the cheese-makers of the United States. There are something like 10,000 of them altogether, and if each one could express his individual opinion, he would say the same thing as I have—that they look to Canada very often for assistance. We are working along similar lines. But I have had some of my ideals a little shattered by hearing some of the addresses and papers read at this convention. I find you have such things as bad milk and cream and bad dairymen, and poor cows, and some other things which I thought we had a mortgage on in the United States. It is somewhat of a comfort to find out I am not entirely in a strange land, and I feel more at home when I find you have some of these problems to solve which we are meeting with from day to day.

This is a matter that concerns the whole world; and when we come to consider the needs of humanity, and the means of feeding the human race, we find that we are all akin—we all need the same thing, and we are all running up against the same problems. We find that the question of dairying is as important from an agricultural standpoint as from any other question of agriculture. It fills a greater place, perhaps, than any other question, and the men who are working in the factories, manufacturing butter and cheese, have a great part in this problem of agricultural work. But I want to talk to you this afternoon about the work of the butter-makers in the factories.

The question of good butter is of more importance than is sometimes thought. In its manufacture the farmer, the maker, and the consumer are alike interested. The producer, in getting a fair price for his product; the manufacturer, in finding a ready market; and the consumer, in getting quality for his money. The three are so closely associated as to be inseparable. What influences one will react on the other, and under normal conditions of trade the butter-maker holds the key that opens the way to the successful accomplishment of the purposes of each.

Fine butter creates its own demand. The average household will consume about the same quantity of butter for cooking purposes throughout the year. The same family will vary materially in the amount used on the table, and this variance will be measured almost solely by the quality of the butter furnished for such use.

It will be seen that the demand that may be created for butter beyond that made by an ever-increasing population, and prosperity, must be through catering to the appetite of the consumer, encouraging him to eat more butter because of its good, wholesome flavor and taste.

There is in the markets a constant shortage of high-grade butter, and fancy grades that run uniform in flavor, body, color and salt, sell at a marked advance over the common grades. A market is assured because the consumer cannot satisfy his demands under present conditions.

The farmer is entitled to all he can get for his butter fat. Just how much that will be will depend upon at least two important factors: his ability to produce and deliver to the creamery a superior article of cream, and the efficiency of the factory to turn this to best account. Too often the first of these factors, apparently, fails because under stress of competition or otherwise, the creamery does not discriminate in price between good and bad cream. Such failure to draw a definite line means, ultimately, that all the patrons of such a creamery will be forced to take the price of poor cream. Any temporary gain secured by the individual selling poor cream will be disastrous to the whole community sooner or later.

The efficiency of the creamery management to make the most of the products with which it works also measures the ratio return to the producer. The creamery operator who can make 120 lbs. of butter from 100 lbs. of butter fat as compared with a neighboring creamery's 110 or 112, has from 8 to 10 lbs. the advantage on every 100 lbs. of butter fat purchased, and can give correspondingly greater returns to the patrons.

To what extent is the butter-maker responsible for the quality of cream delivered at the creamery? The amount of butter that may be made from a unit of butter fat? The price this butter will bring on the market and the building up of a greater demand for fancy butter? Before these questions can be answered the butter-maker's position must be fully defined. The creamery, unlike any other manufacturing plant, is unable to select its raw material from an unlimited field. This localizing of territory from which supplies can be drawn limits the power of selection, and to that extent limits the ability of the creamery to manufacture a fancy article, to the ability and willingness of the producer to furnish the necessary grade raw material. In almost every other business the manufacturer, if dissatisfied with his materials of manufacture, can turn to other sources until he is satisfied. He can control the quality of output of his plant according as he has ability to make this selection.

The area from which cream can be bought, with profit to the farmer, cannot be extended beyond the limits of transporting from the farm to the creamery in a few hours. When the distance is so great that the cream cannot be in the cream vats ready for churning the same day it leaves the farm, there is little hope for the quality of the butter.

The successful creameries are those in which the butter-maker can come in personal touch with the producer of the raw material, and by such close relation, by wise counsel, and firm policy, constantly raise the standard of quality through such methods. The inability to select a patronage must be more than offset by his ability to control the patronage that is his by force of circumstances, and through such control secure an article that will return the greatest profits to the producer. This would appear to be the first work

of the butter-maker, and the success of all future operations, so far as quality is concerned, will depend upon his ability to do this work in a masterful way. To perform this duty the butter-maker must be a good judge of quality of cream. He must be able to impress his judgment upon the patron in a way that will bring confidence and desire for improvement; he must be firm, impartial and just to all; the results of his work in grading, testing and weighing should be accepted because of his ability and honesty; anything less than this will bring discredit and ultimate failure.

The butter-maker from this standpoint certainly holds a most respon sible position, and it is this part of his work that will test his ability more than any other; because in this, the faculty of getting along, tact, diplomacy. and all those qualities which mark the successful man in business will be shown.

It will be seen from this that the term "butter-maker" is inadequate, incomplete, and fails to convey a satisfactory idea of the position and duties of the man who goes by that name. It is unfortunate that a name with so narrow an abstract meaning should have come to be applied to so important a position. There is much in the dignity of a name, and it is entirely possible that a profession may not expand to its fullest breadth and become what it should because of an unfortunate selection of its name. Who can say that the butter-makers to-day would not have a broader conception of their work, and that the teachers of butter-makers would not have had broader conceptions of their duties had a term been created for the position now called "butter-maker" which had in its conception and meaning more than the mere act of making butter? And that, out of such a conception, there would have come a broader and higher plane of creamery work which would appeal to better men to enter the ranks and have better results obtained for producer and consumer alike?

Nearly every industry of the farm to-day has passed from the control of the farmer through the reduction of his work to the mere producer of raw material. The man who makes and sells the finished product controls the market for these raw materials, and often through combination and discrimination is able to fix the return that the producer should receive. The only product of the farm of any great magnitude still in the control of the producer is the manufacture of butter and cheese. The perishable nature of the raw materials makes it impossible to concentrate the business at any one point, except to a very limited extent. As the success of a business does not rest solely on the immediate returns to its promoters, but rather on the ability to produce lasting returns based on quality at a minimum cost to producer and manufacturer, the incipient attempt to centralize the dairy business and remove from the farm the control of the most important of its product is bound to fail. Any seeming temporary success in this line has its foundation in the inability of the butter-makers of the country to properly perform the duties with which they are entrusted. These duties are not considered seriously by some men who are making butter. This class are simply packers and scrubbers; they neither know the principles underlying their work nor care for their trust to their employers.

The man in a store or a bank who would handle 25 cent pieces as carelessly as any butter-makers handle pound weights of butter would be immediately discharged; yet, is it a greater sin to throw away $5 a day in coin of the realm than it is to throw away the same value in butter? The butter maker who thus wantonly wastes the butter fat in his keeping to the extent of hundreds of dollars per month, would suffer immediate discharge should he be unable to show the balance of cash his books called for each night. The illustration may be brought still closer to the butter-maker's work. He is

held strictly accountable for every pound of butter taken out of the churn. If the day's operations have produced 500 lbs. of butter, and he can the following day account for but 495 lbs., the chances are he will be required to make good; but, if from 420 lbs. of butter fat bought that day he makes only 480 lbs. of butter when he should have made 504 lbs., neither he nor his employer think anything about it. And yet, here is an actual loss of 24 lbs. as against 5 lbs. in the former case. This exaggerated difference between the idea of value in a silver coin and value in a given amount of butter fat having exactly equivalent worth of the silver coin and interchangeable, under trade conditions with it, is a difference of education.

Here, again, the work of the butter-maker must extend beyond the scrubbing of floors and the packing of butter. His responsibility extends to the keeping of account of every pound and fraction of a pound of butter fat given him to manufacture into butter, and his knowledge should be sufficient to enable him to calculate, in advance, the exact outcome of his operations. Butter of uniform composition and flavor from day to day will require in its manufacture the ability of the best men who will go into the business. Only such results should be tolerated by the employer, and if the farmer is to realize the most for his product he must insist on only such methods being employed as will bring these results.

A careful study of the butter as it arrives on the markets reveals the fact that there is very much careless, indifferent work being done in the creameries. Government inspection reports show that many, if not the greater part, of the faults found originate in the creamery, and are due to lack of wormanship on the part of the butter-maker.

Reports of the operation of the creameries show that the great manufacturing industry known as butter-making is in a very crude state of development. There is no systematic standard of operation as there is in banking, merchandising, or in many lines of manufacturing. It can be shown that in very many creameries the only decently kept record will be the milk or cream sheet recording the weight of milk or cream delivered by the patrons; every other operation of the creamery is unrecorded, even to the weight of butter shipped to the commisison house.

This is a serious situation, and it is an interesting speculation as to just where the blame may be laid for this condition of affairs. Such speculations will not solve the present difficulty. It is evident that there must be established a higher standard of requirements to be met before a butter-maker is eligible to appointment as the head of a creamery. This standard will require a very much better technical training in the dairy schools than has been given in the past, and a wider experience in practical work before the butter-maker can hope to assume the responsibilities of his position. In other words, the grade of school work must be raised, and at the same time less dependence put upon it to make a butter-maker.

To those who believe in the perpetuity of the local creamery system, either individual or co-operative, this is said in all seriousness. There is in various parts of the country a steady development of the centralization of the creamery business. The only point of advantage this system has is in the use of strict business methods in the factories. Their methods of gathering cream are the crudest ever devised, and only result in paying a premium for the poorest cream. The only purpose of bringing the centralizers into this discussion is to show that they have made the business of manufacturing butter a science, and that in the technique of manufacture they are years ahead of the average local creameryman and the dairy schools.

The average dairy student or butter-maker of years of experience in local creamery practice going into one of these churning plants finds that

he has to unlearn most of his store of knowledge and begin all over again. This is so true that the managers usually prefer to select help that has never been inside of an ordinary creamery or a dairy school. A green man can be more quickly taught the work of pasteurization, cream-ripening, churning and packing, where everything is done by exact system, than can the man who has had a training or experience that has taught him that system cannot be used in creamery operations.

It might not be a bad idea to have our dairy schools stop the making of mere butter-makers and give courses in creamery superintendence. It is quite possible that if creamery superintendence had been the cardinal subject, instructors would have long before this realized the vast difference between making a churning of butter—treating it solely as an individual—and the making of a series of churnings, all of which must tally in their results. The perplexing problems of churn yield and uniformity might to-day be easily controllable by butter-makers, instead of being one of the most vexatious questions, had the early viewpoint of the teachers been different. It might be well if the creamery owners, the dairy press and the butter-makers themselves would grasp this broader view of the work of the man who runs the creamery.

The creamery superintendent of the future will be the butter-maker of the present working along broader lines. He must be expert in the science of making butter; he must be enough of a business man to recognize the full value of records; he must be diplomatic and tactful enough to compel the delivery of good milk and cream; he must be given enough assistance so that these greater parts of his work may be done thoroughly and without too much hurry; his assistants will do the less important work of manipulating machinery, scrubbing, and handling of cream and butter; all this work will be done under the creamery superintendent's watchful eyes. The helper of to-day will be the butter-maker of to-morrw, when the butter-maker has become the creamery superintendent. The dairy schools will no more think of taking students in order to teach them to operate the separator, churn, or to pack butter than does the agricultural school to teach them to plow a furrow or put up a stack of hay. While these things may come incidentally, the work will be the teaching of the underlying principles of creamery practice. It may still be necessary to teach the art of butter-making, and this will be worked out along the lines of trade school instruction.

And those who have furnished such a course will go out not as creamery superintendents, but as butter-makers or the equivalent of second man in the present method of organization.

This broader conception of the work of the butter-maker will mean a higher standard of wages. To this many creamery companies will object, claiming that they are already paying all the traffic will bear. The records of a thousand creameries taken at random in the United States will show that in 90 per cent. of them employing cheap men, the losses by so doing would amount to double the butter-maker's salary each month. The losses are not always due to lack of knowledge or of interest on the part of the butter-maker. In many cases the company does not employ sufficient help, making it impossible for the butter-maker to attend to the most necessary part of his work. His whole time must of necessity be taken up with the rougher part of the work that could be done by a beginner in the business. This short-sighted policy is costing the creameries of the country many hundreds of thousands annually.

Statistics amply prove that under conditions such as have been described the creameries of the country are prosperous, and as a rule the patrons are

well paid. Could, however, better methods of manufacture and business be generally put in practice it would mean millions in addition to this greatest industry of the nation.

Enough has been said to indicate that the work of the butter-maker—or, better, the creamery superintendent—is a most important factor in the success of a creamery. In ordinary practice his position makes him superintendent, manager, butter-maker and helper, all in one; and he is so frequently loaded down with work that none of these duties can be performed thoroughly.

He owes it to the owners of the creamery that he be qualified for this position by sufficient training and experience to perform the duties thoroughly and with profit to the concern. The owners owe it to him that they be willing to pay for this service its true worth, and to employ enough assistance that his work may be properly done. With this happy combination of events, the producer would realize more than ever on his product, and the consumer would profit by securing a much higher grade of butter for his table.

This may seem a rather optimistic ending for so pessimistic an address, but it is within reasonable hope that with the dairy schools and the dairy press and the field instructors and inspectors all working towards this end it may be accomplished.

THE CREAM GATHERING CREAMERY.

By Prof. H. H. Dean, O. A. C., Guelph.

We are highly honored to-day in having with us the Chief of the Dairy Division of the great Republic to the south of us. I have had the pleasure of meeting him several times at dairy conventions in the United States, and have always found him well informed, a man who is able to express his ideas clearly, and a man who is doing excellent work in the United States. There is just one thing I would take exception to in his introduction, and that is he said he hoped more Canadians would go over into the United States. I object, Mr. Chairman, very strongly to Uncle Sam taking any more of our Canadian boys. (Applause.) I believe we can find work for all of them here in Canada, and I believe the day is not far distant when we will pay them just as much money and give them just as good a time as they can have with Uncle Sam.

It is related of Phaeton, son of Sol, who got leave to drive the Chariot of the Sun for one day, that his father (the sun) admonished him somewhat as follows: "Do not ascend too high, or you will burn the heavenly mansions; do not descend too low or you will reduce the earth to ashes; do not drive to the right or you will meet with the constellation of the Serpent; avoid going too much to the left or you will fall in with that of the Altar. *Keep in the middle.*" In spite of these directions Phaeton, by his unskilful driving, upset the chariot, setting heaven and earth on fire, and was hurled by thunderbolt from Jupiter into the River Po. Mythology further tells us that from the tears of his sisters amber was created.

While we do not anticipate, on the present occasion, any such calamity as befel the son of Helios, a speaker who appears year after year before this august assembly of the dairymen of Western Ontario is in great danger of upsetting the dairy chariot, or of running into one of the great constellations which hover along the milky way. However, with your permission,

Mr. Chairman, I shall try to control the steeds of fact and fancy, achievement and imagination in such a way that as little damage shall be done and as much good as possible shall be accomplished during our half-hour drive in the dairy chariot along the milky way of imagination, but the creamery and cheesery road of hard fact.

Sometimes we are able to obtain a better view of ourselves and of our subject by contrast than in any other way. We shall, therefore, treat of the subject in hand by contrasting the butter and cheese business as a whole, then in particular, with reference to patrons, makers, factories and products.

Taken as a whole, the cheeseries of the Province seem to have flourished better than have the creameries. This is largely due to the fact that cheeseries have been able to pay higher prices for milk than have the creameries. This, too, rests upon a commercial fact, viz., that cheese contains more nutritive material than does butter. In the process of cheesemaking, in addition to the water of milk, which probably has at least a dietetic value. two of the chief compounds of food value in milk, viz., fat and casien, are made into the substance known commercially as cheese. There are also other constituents of milk found in cheese in minor quantities. Cheese may be considered as the chief dairy food of the working man, as it furnishes material for building muscle as well as material for heat and energy.

Butter, on the other hand, is largely a fuel food, *i.e.*, it furnishes material for heat and energy but does not supply muscle-forming constituents. To a certain extent, butter is a luxury for the workingman. When it becomes too high in price, the economical housewife with limited means tries to get a substitute such as "oleo" (in some countries), fat meat, gravy, drippings, etc. Because of these facts, the market must always be more limited in large populations for butter than for cheese. The consumer may not understand much about the chemistry of foods, but he or she knows that substitutes for butter are more easily and cheaply obtained than are substitutes for cheese and milk.

From a purely commercial food viewpoint it would seem as if the cheese business is likely to be more stable than is the butter trade. On the other hand, we need to consider the effects of these two branches of dairying on soil fertility, which after all, is the basis of agricultural prosperity. Byron said, "As the soil is, so is the heart of man." On thin, worn-out soils, the butter business is undoubtedly the best form of dairying. Many sections of the Province are carrying on the cheese trade at a great sacrifice of soil fertility. The natural conditions are much more favorable for buttermaking. It would be wise if such districts would confine their efforts entirely to selling cream or butter and allow the cheese to be produced on the richer clay lands, such as abound in Oxford county. Many farmers on light, thin soils, are sacrificing future prosperity for a present gain. How hardly shall they that impoverish the soil dwell in happiness and comfort on the earth or inherit the future kingdom! Conditions of soil and roads, methods of farming and inclinations of the people, ought to be strong factors in deciding whether cheese or butter shall be manufactured in a district. Where the soil is light and the roads not good, especially where the people are inclined to make a strong feature of other lines of live stock, besides pure dairy stock, the creamery is undoubtedly the best form of dairying to follow. On the other hand, where the soil is rich, the roads fairly good and the people are inclined to specialize in dairy stock, then the cheese business is likely to be most profitable to the farmers and to all concerned.

Before leaving this general question we should like to call attention to the following item in a leading Canadian trade journal of recent date:

"With a big decrease of 294,613 boxes of cheese and 193,734 boxes of butter in our exports this season to date, the question may well be asked if our export trade in dairy products is not on the road to final extinction, similar to the change in the same direction as that which has taken place in the United States, in its butter and cheese exports?" After speaking of the fact that it is difficult to account for this decrease in dairy exports, the article concludes: "Surely we cannot afford to dispense with an export trade that has brought the farmers of this country a revenue of $23,000,000 to $26,000,000 a year."

The foregoing comments should cause all those connected with the dairy business to stop and consider very carefully, what should be done in order to stop this progress to "final extinction." We may very well ask ourselves if the farmer, the cheesemaker, and the buttermaker are getting their fair share of the profits in the business. Have the workers been having "a square deal?" Has there been an undue share of the profits diverted into illegitimate channels? Why are many of the best cheese and buttermakers leaving the business? What is to become of the business when the making is left largely in the hands of inexperienced men? These are questions which must be answered, and conditions which must be changed, if we are to continue the export dairy trade along profitable lines.

Patrons of Creameries and Cheeseries Contrasted.

Patrons of both must have good cows in order to produce milk or cream profitably. For the creamery, we need cows which will produce from 300 to 500 lbs., or more, of butter annually. For the cheese factory we need cows producing from 10,000 to 20,000 lbs. milk, or 1,000 to 2,000 lbs. cheese annually. A leading American dairy journal said recently regarding the new Hart casein test, that it promised to do for cheesemaking what the Babcock test has done for buttermaking in developing a special butter cow giving milk with a high percentage of fat. The writer goes on to say that he sees no reason why a special cheese cow may not be developed, *i.e.*, a cow which gives milk containing a relatively high percentage of casein. We are pleased that the position which we took some fifteen years ago, that milk for cheesemaking should be paid for on a different basis from that which is adopted for the payment of milk for buttermaking, is now being recognized as the correct one.

At present, patrons of cheeseries are at a disadvantage as compared with patrons of creameries in the matter of a just system of dividing proceeds from sales of products. Almost invariably creamery patrons are paid according to the butter value of milk or cream, while patrons of cheese factories are paid chiefly according to a system which places a premium on dishonesty, or else are paid according to a plan which places too great a premium on but one milk constituent, viz., the fat. It is well known that both fat and casein of milk are essential in the manufacture of cheese, and both these constituents should be recognized in any system adopted for paying patrons of cheeseries. It is little wonder that some of the best patrons of cheese factories have withdrawn their support from an institution which has for its motto, "Every man for himself and the devil take the hindmost." We welcome the advent of a test which enables a person to ascertain the percentage of casein in milk quickly and accurately.

The patrons of creameries have an advantage over patrons of cheeseries in that the by-product (skim-milk) is a more valuable food for stock than is the by-product whey, from cheeseries. As the importance of live stock

interests grows, the importance of skim-milk for young stock will be more appreciated. The relative food values of skim-milk and whey is probably 4 or 5 to 1; i.e., if whey be worth five cents per 100 lbs., for feeding purposes, then skim-milk will be worth 20 to 25 cents per 100 pounds. Some would place whey as being worth not more than one-third the value of skimmilk.

Wherever these by-products are, the result of mixing milk from various farms in the process of manufacture, it is very important that the whey, skim-milk, and buttermilk shall be pasteurized before returning to the farm, in order to prevent the spread of bad flavors, but more particularly to prevent the spread of disease. The heating of whey, etc., to 160 degrees to 165 degrees F. will destroy most of the bacteria found in milk. Especially is this true when the heating is continued for one-half hour or more.

As a rule, patrons of cheeseries supply better raw material than do patrons of creameries, more particularly patrons of what are known as cream-gathering creameries. Poor raw material is the weakest part of our butter-making industry. How to get an improvement is one of the greatest questions confronting our creamerymen. Probably the most effective plan yet devised is to grade the cream and pay a price according to the quality or grade. Not more than two or three grades should be made and for each grade there should be a difference of one to two cents per pound fat or butter.

For first grade we should suggest a standard somewhat as follows:

1. Cream must be sweet, clean flavored, and test not less than 25 per cent. fat.

2. It must be delivered in individual cans not less than three times a week.

Second grade cream would be all cream which could not be graded as first. In case a third grade were deemed necessary, the advisability of which we very much doubt, all thin, sour cream of poor flavor should be put in this class, but it would be better not to accept such at all.

From our own practical experience, we should judge it impossible, or nearly so, to sucessfully carry out any system of grading cream unless all the creameries in the district will adopt the same method. Co-operation, not competition, is essential in order to improve the quality of the raw material furnished to our creameries.

One other point. It would be advisable for patrons of both cheeseries and creameries to provide a supply of ice, but for those sending cream to our creameries it is almost essential that they have a large supply of ice for cooling cream. Now is the time to lay up a store for next summer's use. Provide about one ton of ice for each cow you expect to milk next summer. This need not cost over one dollar per ton, or ten dollars for ten cows. It will prove a profitable investment for all patrons.

Makers Contrasted.

We are aware that "comparisons are odorous," but at the risk of injuring some person's feelings we should like to contrast the men now responsible for the making of cheese and butter.

A few years ago, possibly at the present time, the cheesemakers of Western Ontario would compare very favorably as a class with any body of men belonging to similar trades or professions. There remains still, a number of excellent men in charge of our cheese factories, but many of the best men have left or are leaving the business. Then again, the younger men do not seem to be qualifying for the responsible position of manager of a

factory. About fifteen years ago, when the Dairy Schools were established, they were crowded with cheesemakers anxious to learn the latest and best methods. Some of our best men went to the United States before there were any Dairy Schools in Canada. At this time there were very few buttermakers at the Dairy Schools, other than those who were making butter in cheese factories during the winter.

What is the condition to-day? At our own School in connection with the Ontario Agricultural College, the buttermakers outnumber the cheesemakers, yet we have probably ten times the number of men engaged in the manufacture of cheese as compared with buttermakers. Who among the cheesemakers are preparing themselves to take the places of men like Adam Bell; "Billy" Bothwell, John Brodie, The Travis boys, "Tom" Grieve, The Boyes boys, and others who might be named,—men who fitted themselves for their work in the best way possible? These men, in the natural course of events, must soon pass off the stage of action. What will become of the great Canadian cheese industry if the coming generation do not think it worth while to obtain the best possible training in order to fit them for their life's work? These are serious questions for this Association to consider.

We are free to say that the men engaged in the actual making of our dairy products are not sufficiently remunerated for their long hours and heavy work. As regards the work of the two classes, we may say that buttermaking is undoubtedly lighter, pleasanter, and less nerve-racking than is cheesemaking. Cheesemaking requires more muscle, more skill and longer hours and consequently, the cheesemakers should receive higher pay. Both deserve more pay than they receive at present, but if any difference is made it should be in favor of the cheese-maker. But in no case should a second or third class man expect to receive first-class pay. A man should be rewarded according to his skill, knowledge, honesty, and faithfulness to duty.

Factories.

I need say very little by way of contrasting the buildings in which butter and cheese are made, as this is fully dealt with in the report of the Chief Instructor. There are two points which need special emphasis, viz., that new buildings should be constructed with a view to controlling the temperature, having good ventilation, durability and convenience; and secondly, that dairy buildings need constant repairing else they soon become unsanitary. In addition, provision must be made for the proper disposal of the sewage. As this subject is also fully dealt with elsewhere we need not dwell upon it.

While nearly all are agreed that the change from the whole milk to the cream-gathering form of creamery has not been in the best interests of improving the quality of our butter, the cream-gathering creamery is here to stay, for a time at least, and we may as well plan our buildings accordingly. Where the whole milk is delivered at the creamery or cheesery we must of necessity have a much larger building than where cream only is delivered; hence, in the latter case, a portion of the funds devoted to a larger building should be used in improving the durability, convenience, and sanitary conditions. We are bound to say we have not yet seen what might be called a model creamery or cheesery.

Finished Products.

We have already pointed out the fact that cheese has a higher nutritive value as a food than has butter, and that it is more likely to be the food

called for in larger quantities by the British workingmen and purchased by the economical housewife, who has limited means for the purchase of food. In Canada, however, cheese is regarded more as a luxury, a dessert food, etc., while butter is the more staple article. As our foreign population increases we shall probably see a change in this respect because of the fact that Europeans are cheese eaters.

We have this suggestion to offer to cheesemakers, that they stir their curds less so as to retain more of the milk solids. A New Zealand cheesemaker on this point says: "The toil of the cheese-maker is enough without adding this infernal device to break his back and give him cramps in his stomach." From our experiments conducted on this point we feel satisfied that Canadian cheese-makers are making for themselves unnecessary labor and losing valuable cheese-making material by so much stirring of the curds. If the work previous to the removal of the whey has been properly done it is not necessary to stir curds so much as is commonly advised. Make a few experiments and note results.

We have another suggestion. Many makers mature their curds so much that much unnecessary loss of fat occurs. Again we would say that if the work previous to salting has been properly done it is not necessary to wait four, five, or six hours after dipping, before the curds may be salted.

By modifying the method of making cheese on these two points we feel that a finished product will result which will better suit consumers and one which will better compete with European cheese; besides it is less laborious. We do not advise any radical changes in methods of making, but throw out these hints to be followed so far as practicable. Cheese and butter-makers need to study the wants of consumers. The middle-men are not always safe guides as to what the people want in the way of food.

If we are to export butter it would seem that we should turn our attention almost wholly to the making of unsalted butter. A leading firm of London, Eng., to whom we made experimental shipments of butter during 1906 and 1907, in reply to our inquiry as to whether or not the addition of salt to butter for London market had a deleterious effect, say in a recent communication: "On a market in which the supply of salted and unsalted is about equal to the demand for each, the difference in value between an unsalted butter, and the same butter to which, say 2 per cent. of best salt has been added, would be about two shillings per hundred weight. The risk with unsalted is owing to there being considerably less buyers for saltless than for salted, and every now and again the supply of saltless is in excess of the demand, and has to be sold at a considerable discount on the price of salted."

In our own practical experience in sending butter to London, Eng., market during the past two seasons we have received about two shillings per hundred weight more for the unsalted butter as compared with similar lots salted. In some cases, boxes of butter which were unsalted sold for two shillings per hundred weight more than did boxes out of the same churning which were salted.

In most of the unsalted butter some form of a preservative was used. We found that common powdered borax gave as good results as did any of the more expensive commercial preservatives. The quantity of preservative used varied from one-quarter to one-half of one per cent., i.e., to 100 pounds butter we added from one-quarter to one-half a pound of borax, either in dry form or dissolved in water. Sometimes the preservative was mixed with salt. Full details of these experiments will be found in the Annual Report of the Ontario Agricultural College for 1907.

In conclusion let us all do what we can to improve the dairy products of 1908, but more particularly the products from our creameries.

THE NEW CASEIN TEST AND ITS RELATION TO THE DAIRY INDUSTRY OF ONTARIO.

By T. Herbert Lund, Madison, Wis.

I am here this afternoon to give you an explanation and demonstration of the new test for casein in milk, recently got out by Prof. Hart, chemist of the Wisconsin Experiment Station.

The multiplication of tests during recent years is an encouraging sign, indicating, as it does, a desire on the part of those concerned, for greater knowledge of the products they handle in order that they may carry on their operations to the best advantage.

Looking back to the year 1890, we find the first practicable test for fat in milk introduced—the Babcock test. About the same time, we get the Harris rennet test. Five years later, the cheese-maker is enabled to pick out the poor milk by means of the Wisconsin curd test. 1905 saw the introduction of the acidimeter into Ontario creameries and cheese factories. The past year has brought forth three practical, rapid, and accurate tests for moisture in butter and cheese: the Gray moisture test, the Patrick aluminum beaker method, and the high-pressure oven. And now, most recently, we have the Hart test for casein in milk.

Before discussing the details of the test, I wish to say a few words about casein and the proportions in which it is found in milk and milk products.

Table No. 1. Average Composition of American Milk.

Water	87.5	Casein	2.5	Sugar	5.0
Fat	3.6	Albumen	0.7	Ash	0.7

Table No. 1 gives us the average composition of American milk. These two constituents, casein and albumen, are classed as proteids or flesh-formers. They are nitrogenous bodies of complex chemical constitution, and though alike in some respects, have important differences. The casein is found in milk partly in suspension and partly in solution, and is coagulated when treated with rennet or dilute acids. The albumen is found in solution, but unlike casein, is not coagulated by rennet or dilute acids. It is upon these facts that the casein test is based. The casein is coagulated by dilute acetic acid and separated in such a way that its volume can be measured, while the albumen remains behind in solution.

Let us now briefly consider the relation of the casein to the butter and cheese industries of Ontario.

The composition of creamery butter shows us that usually it contains 1 or 2 per cent. of curd, and this indicates that casein is practically valueless in the manufacture of butter. If you figure it out, you will find that about 94 per cent. of the casein in the original milk is returned to the farm in skim-milk and buttermilk.

When, however, the milk is used for cheese-making, we find that casein plays an important part. Chemical analysis shows that a well cured Cheddar cheese contains about 34 per cent. of water, 33 per cent. of fat, and 26 per cent. of casein compounds, while the analysis of whey shows about 3 per cent. fat, 1 per cent. casein, 4 per cent. albumen, and 5 per

cent. sugar; thus showing that while practically all the albumen and sugar is lost in the whey, about 92 per cent. of the fat, and 96 per cent. of the casein contained in the original milk is retained in the cheese. For this reason, every farmer who hauls milk to a factory to be made into cheese should take an intelligent interest in casein and its relation to cheese yield in order that he and his fellow patrons may obtain just division of the profits according to the value for cheese-making purposes of the milk delivered.

The subject of payment for milk at cheese factories is by no means a new one, although recently up for discussion again in certain of your dairy papers. As far back as 1891 (if you look up your Hoard's Dairyman for that year) you will find Dr. Robertson at the annual meeting of the N. Y. State Dairymen's Ass'n advocating payment on the basis of quality. During the early nineties, several experiment stations made extensive investigations relating to casein and fat in milk and their relation to yield of cheese, thus increasing our knowledge of the subject considerably. The work of your own experiment station along this line can be found in the reports for the years of 1894, 1895 and 1896, and resulted in the conclusion that while payment on the basis of fat alone was not the ideal method, yet it was a considerable improvement on the method of pooling profits according to the weight of milk delivered, which was the common practice at that time. They also recommended, as a still better method, the addition of the factor two to the fat test, which sum would give fairly accurately the fat and casein available for cheese-making, thus recognizing at that date that the casein must be considered as well as the fat. No practical test for casein being then available, the factor 2 was made to do duty instead. Other stations have come to the same conclusion, and while recognizing that the fat basis is not the ideal one, have recommended it as the best available method up to the present time. Let me quote from a recent article of Prof. Dean's in *The Farming World*. He says: "We are safe in saying that all authorities are agreed that if the casein, as well as the fat in milk, could be determined accurately at a small cost, we should then have a more correct basis of comparison as to the relative values of milk for cheese-making than is got by test for fat only." At last we have a cheap, simple and accurate casein test, and if it should prove workable by the practical men in the country, it is possible that the solution of this long-discussed question is at hand.

In studying the subject of milk composition from the average of a large number of analyses, we are apt to overlook the fact that milk is a most variable product. Since the introduction of the Babcock test, we have all become more or less familiar with the variation in fat content of different milks at different times, but few of us realize the extent to which the casein and other constituents may also vary. We see casein placed at 2.5 per cent., get this figure in our head, and never give it another thought.

Table No. 2. Composition of Milk of New York Herds.

	Least.	Average.	Greatest.
Water	86.09	87.33	88.53
Fat	3.04	3.75	4.60
Casein	1.93	2.46	3.00
Albumen	0.47	0.68	0.87
Sugar and Ash	5.32	5.78	6.37

In Table No. 2 we have the results of a large number of analyses of the milk of New York herds, the samples being taken each morning from the milk of different patrons at a number of cheese factories throughout the state. In the centre column we have the average composition, while on either side we have the least and the greatest amount of each constituent which they found in normal milk. Thus we see that while the fat varies from 3 to 4.6 per cent. the casein also varies from 1.9 to 3 per cent. or a difference of 1.1 per cent.

The relation of casein to fat in these milks was found as low as 56 : 100, as high as 72 : 100, and with an average of 66 : 100.

TABLE NO. 3. TESTS OF SINGLE HERD.

Herd.	Casein.	Fat.	Relation of Casein to Fat.	Cheese a 100 lbs. milk
1	2.22	3.7	60 : 100	9.62
2	2.53	3.7	68 : 100	10.39
3	2.40	3.8	63 : 100	10.18
4	2.56	3.8	67 : 100	10.58
5	2.67	3.8	70 : 100	10.85
6	2.41	4.0	60 : 100	10.42
7	2.59	4.0	64 : 100	10.97
8	2.72	4.0	68 : 100	11.20
9	2.81	4.0	70 : 100	11.42
10	2.68	4.2	63 : 100	11.32
11	2.80	4.2	66 : 100	11.62
12	2.95	4.2	70 : 100	11.99

In Table No. 3, we have the fat and casein tests of milk delivered at the University creamery by twelve of our patrons, and, while the tests only cover the short period of one week, they will suffice to give you an idea of the variation which exists and its relation to cheese yield.

TABLE NO. 4. TESTS OF SINGLE COWS.

Cow.	Casein.	Fat.	Relation of Casein to Fat.	Yield of cheese a lb. fat.
1	2.47	5.37	46 : 100	2.25
2	2.77	6.01	46 : 100	2.25
3	2.98	6.04	49 : 100	2.33
4	3.31	5.95	55 : 100	2.49
5	3.12	5.46	57 : 100	2.52
6	3.11	4.83	64 : 100	2.70
7	2.13	3.19	66 : 100	2.76
8	2.47	3.47	71 : 100	2.87
9	2.50	3.44	72 : 100	2.91
10	2.61	3.57	73 : 100	2.92

Table No. 4 gives the tests of ten cows in the University herd, showing still more markedly the variation which may occur among individual animals, giving us in this case extremes of 2.1 and 3.3 per cent. or a difference of 1.2 per cent.

With these facts in mind, it would seem quite reasonable to suppose that by selection and breeding, a strain of cows could be developed, whose

milk would show a greater proportion of casein to fat than is at present the case, and so a greater cheese producing capacity a pound of fat.

Mr. Lund then proceeded to give a detailed description and demonstration of the new test, the essential features of which are as follows:* Two c.c. of chloroform and 20 c.c. of .25 per cent. acetic acid at 70 degrees F. are measured into the test bottle, and to this is added 5 c.c. of the milk to be tested at 70 degrees F. The bottle is then inverted and shaken for 15 seconds, after which it is whirled for 7½ to 8 minutes at a speed of 2,000 revolutions a minute in a centrifuge having a diameter of 15 inches. The casein is read off in percentage directly after the bottles have stood for 10 minutes.

A table comparing results obtained by the new method, with those obtained by the official methods, shows that when the test is properly operated, the results obtained are sufficiently accurate for all practical purposes.

ADDRESS.

By Geo. A. Putnam, Toronto.

We are here this evening with the dairymen of Western Ontario, standing in the fore-front, so far as the production of cheese is concerned, and so far as the quality is concerned, and we look upon the farmers and the dairymen surrounding the good town of Woodstock as among the leaders of Western Ontario. We would naturally expect that from the farmers of this locality, because of the exceptional natural advantages which you have. You have conditions which cannot be duplicated in any other part of the Province so far as territory is concerned. You have good land, good men, and good factories, and we naturally look to you to turn out a good quality of cheese. The Department has been more than gratified with the success attending the Dairy Association during the past year. Dairying education, so far as the instruction in the cheese factory and creamery is concerned, and so far as sanitary instruction is concerned, has been a success. Our main object in making the change of method last year, as you will all remember, was that we might introduce a method whereby every factory and every creamery would come under the direction of sanitary instruction and inspection. The result has been that about two hundred factories have received instruction this year that never heretofore took advantage of the work, and as we heard from Mr. Barr and Mr. Schell last night, it is thoroughness and uniformity of production that is going to count in the dairy industry. But how can we get uniform and high grade unless we are to have our factory instruction along these same lines? The Department has been more than gratified by this change in the instruction. It meant a good deal to the Department. It meant an expenditure of cash on the part of the Department of about $15,000. We did not collect anything from the factories, although in previous seasons they had given us $12,000. While the Department under the present administration, as in the past, is willing to give money for what is supposed to be good work, you must be prepared to show that this money is for legitimate purposes, and for a good object, before you can get the money. When the

*A complete description of the test will be found in Bulletin No. 156, of the Wisconsin Experiment Station, copies of which will be forwarded free to applicants.

case was properly presented to them by your representatives, then the Department came to your assistance. This change in the system also causes the Department some anxiety, and so far as some of us were concerned, we would rather give the cash than endure the anxiety. We certainly approached this change with some hesitancy, in the method of giving authority to such large number of men to go to the factories, and go to the private producer, and say to them, "You must place your quarters in a better sanitary condition." We hope to do that, but as is usually the case, our greatest troubles are those which we never meet. I believe that the most of our troubles are those with which we never come face to face. This was the case with regard to the instruction work the past season. I have inquired from the chief instructor, and from Institute workers, and from men in connection with the Dominion Department of Agriculture, regarding the system which has been introduced during the past season, and they all have said that no criticism has been made. No unfavorable criticisms have reached their ears. This is most gratifying to the Department, and I am sure must be to your Association.

We have learned another lesson from the past season's work. The producers throughout the country have learned one lesson which a few refused to learn until this season. They were fearful that the Department and the Association were going to introduce some system which would be burdensome to them. They said they would not submit to arbitrary measures. I think the system upon which the work has been carried on during the past season, has demonstrated clearly to the factory men that it is neither the wish of the Department nor of the Association to do anything which will be burdensome to any person.

We are all working for the one aim, the uplifting of the industry as a whole, including the producer, the maker, the salesman, and the buyer. We must all work in harmony or else the greatest results will not be attained.

There is undoubtedly a great wave sweeping over the whole continent for better sanitary conditions. We have heard at this convention, and at other conventions, that the key-note in connection with the dairy industry, is cleanliness. In our city there never was previously such an agitation for pure water supply, for better sewage disposal, and more cleanliness. We find it is the same in the towns and villages; they are beginning to awaken to the fact that they must keep their premises in a sanitary condition and practice those methods which shall eliminate, as far as possible, the injurious bacteria about which we have heard, and about which you will hear some more no doubt. The enforcement of legislation is another question. To get farmers to practice cleanly methods has been one problem which has faced the Department and the Association. Cleanliness in dairying is different from cleanliness in other lines of work. That has been fully explained to you. I might just say a word as to what we have done in the Department and what the Ontario Department is doing towards instructing the producers and farmers and others engaged in the industry. In the first place, we have our dairy instructions about which you have all heard so much; and then this year we have offered, at the Department's expense, to send to the annual meeting of every factory a speaker who will address the patrons in attendance at that annual meeting. In this way we are able to get at men who have not heretofore taken advantage of institute meetings and other means of education. We believe that the work is being done at this annual meeting which cannot be accomplished

in any other way. In Eastern Ontario, during the latter part of November and December, we sent speakers to over two hundred annual meetings; and a great many were attended in Western Ontario, and we believe fully two-thirds of the factories, (which will mean about 800 factories), will receive instructions at their annual meetings. This is a splendid work. We might also make mention of the Farmers' Institute work. We are giving prominence to the Dairy Institute and the Farmers' Institute work. There are so many questions demanding the attention of this organization that we cannot give too much prominence to any one Department of the work. However, we are aiming to send to the dairy districts, at least one member of the deputation who will be able to give you instructions along some line of dairying. Then, of course, you know of our Dairying Schools; and we regret to note that this year both at Kingston Dairying School and at the Dairying School at Guelph, the attendance is not so large as formerly. What is the reason for this? We believe that we have in the ranks of the dairymen a lot of very bright men, but we regret that they are not taking advantage of the opportunity afforded for appreciating it, and learning more about their business at these Dairy Schools. Now, I wish to appeal to the farmers and the factory men who are here, that when they go back home they do something to spread this good news among the dairymen of their several localities. With one meeting a year you cannot hope to accomplish very much, although I think we will all admit that much good has been accomplished through the Institute, and other organizations. I trust you will endeavor to organize some sort of local club in your locality, in order that you may meet once a month, or oftener during the winter season, and discuss your own local conditions. Now we heard a good deal at the Eastern Convention on the unfavorable conditions which exist in the east. The Department cannot step in and wipe out part of these factories. The dairymen must come together, and must discuss their own local conditions, and solve their own problems. The Department always is ready to come to your assistance on any reasonable questions. But there are some things which the dairymen must do for themselves. We trust you will place yourselves in communication with the dairymen of the district, and work out your own salvation. We believe that through these monthly meetings, you have the means by which you can derive more good than you can from such gatherings as this.

I would leave that one message with you, and I hope you will take it home with you. One reason why I am so strong in recommending this, is that the Women's Institute has grown so rapidly during the last five years, and this is due largely to the fact, that they have depended upon their own resources, and have adhered to their own local conditions, and it is up to the dairymen of Western Ontario to make a little effort to help themselves.

ADDRESS.

By Col. James Munro, M.P., Embro.

While I never have been very closely identified with the Dairymen's Association, yet I have been interested in dairying. I have all my life been a consumer of some of the products of the cow. I even know what turnipy milk and butter is. I have been a patron of the cheese factory. I have been engaged, and am still engaged, in raising and feeding stock, so that I can fully appreciate the great good that is being done by these meetings, not only to the farmers in general but to all classes of the community.

These meetings give an opportunity for an interchange of views upon these subjects, and for the spread of information that tends to improve the methods of dairying, the treatment of the cow and her milk and the manufacturing of it into cheese and butter so that the best results may be produced.

For the last few years there has been a wonderful growth in the many industries of our country, but in none have there been such great developments as in that of dairying. I can well remember the industry in its infancy in this country, and the pioneers who were engaged in the work. I can remember Hiram Rennie, John Adams, Samuel Nelles, and a score of those who struggled along, and who were a great benefit to the several communities in which they worked; but somehow, regretful to say, it was not to their own pecuniary advantage, because they were forced to quit the business much poorer men than when they entered it. It is hard that such men should not meet with a different and better reward than they did. That was before the advent of the joint stock company factory, and before the advent of the dairy school, and before the factories had the advantage of instruction and inspection, and many of the present day facilities. Now, when these have been supplied, and after putting in proper plants and machinery, with proper sanitary conditions surrounding them, there can hardly be any excuses for turning out a poor article of cheese or butter, provided, of course, that good pure milk is supplied. My experience has taught me that it costs quite as much to keep a scrub, ill-shaped bullock as it does to winter the best pure-bred Shorthorn or good grade, that would readily bring them $60 to $70 for the export trade; and it will cost as much to keep a cow that would yield five quarts of milk as it would to keep one that would yield twice as much. It would be short-sighted policy on the part of the farmers to go to the trouble and expense of keeping 20 cows when 12 or 15 might produce the same results and profit. We cannot all expect the good results that Mr. Bollard obtained; but that is a good mark to aim at, and shows what can be accomplished by careful selection of cows from a family of good milking strain, and improving them. The same thing applies to beef producing animal. It does not pay to keep a poor animal of any kind.

Dairying is the bulwark of our Province to-day, and I do not think the farmers appreciate as much as they ought to the favorable condition they occupy as compared with other classes in the community, especially in times of financial stringency such as we have at the present time. Other factories are closing down, but cheese and butter factories go on forever, with slight interruption. I am pleased to be present to-night with you, and congratulate you on the great success attending your meeting here, and hope for a continuance of the advancement of the great interests in which you are engaged, and in which the whole Dominion is deeply interested.

CLEAN MILK—AN ILLUSTRATED TALK.

By E. H. Webster, Chief of Dairy Division, Washington, D.C.

The question under discussion is that of clean milk. It is a question that has a bearing on almost every phase of human life. We start in from a very early age to drink milk, and we keep at it until we enter the grave. Milk is an important household necessity; it is something that the house-

wife has to use in all her cooking operations. On the table it is in our tea and coffee, and we also use it for drinking purposes. We use the products of milk in butter and cheese and ice-cream, and numberless other articles, which are now on the market, are made from the products of the cow. Certainly the question of clean milk is one of vast importance to the consumer of dairy products, and it is one that is little understood by the producer and the consumer alike. It is little understood, because our viewpoint as to what clean milk is is different in so many cases. What is clean to one person is unclean to another, and so on; and therefore, it is very hard to determine from any abstract meaning of the word "clean," what it may mean to you or to me what it means to the housewife who does the cooking, or to the public who drink the milk. Therefore, I say, the word "clean" to us has an abstract meaning.

In discussing this matter of clean milk, there are three important facts to be considered. First of all, must be the health of the cow giving the milk; second, must be the health of the attendant who handles the milk from the time it is milked until it is consumed; and third, must be the cleanliness of the water and utensils that come in contact with the milk on its journey from the cow to the consumer. You have before you a picture of an animal. I can hardly call her a cow, and many of you would not recognize her as a cow. I have put this picture on simply to show the kind of animals that are sometimes used for the supply of milk. This animal is evidently suffering from tuberculosis, and several other things, and we have people in the United States that sell milk from this kind of a cow.

It is so important that milk congresses are being held all over the world to get rid of that kind of cow. I fully believe that we have proven that tuberculosis of the bovine race and the human race are one and the same. Now if that is the case, and the probabilities are that it is, what of the man who will sell milk from an infected herd of that kind? He is nothing less than a criminal. And yet statistics show us that around many cities we find as high as sixty and fifty per cent. of the animals producing milk to feed to the infants of these cities are affected with tuberculosis. If you will read modern scientific literature on this, and the readiness with which contamination will take place, you will see at once the great fight that must be had in eradicating tuberculosis from our herds all over the continent. Our own Government has gone so far as to stop inter-states shipment of cattle affected with tuberculosis, to stamp out this disease because it means much to the human race.

It is very certain that clean milk cannot be produced under defective conditions such as you see in the picture I now have before you. Here is a very convenient way some dairymen have of stacking manure, by just throwing it outside. You see the whole place is very untidy, and pails of water stand around. It is anything but a healthy place for animals, and much of the tuberculosis comes from animals living in such places as that; and yet there are plenty of barns like that, and I saw some of them coming along the train in Canada.

Those who were here last night will remember seeing that barn in Dutchland. It did not show any of the signs you see here—the ceiling covered with cobwebs; everything in such shape that it is impossible to produce clean milk. The barn and buildings of farmers are the index of the man.

Here we have the interior of a barn with smooth ceiling and smooth floors, the stalls are made of piping, and there is very little chance of contamination, and the man who works in a barn like that, must feel that he has got to keep clean himself.

We have one dairy near New York city where practically every cow has a bath before she is milked. They take a sponge and brush and wash the cow off. That is something that every farmer could not do, and it is not necessary. They can afford to do it on this particular farm, because they have a reputation that sells their milk at a high price. If everything is clean and kept clean you are bound to produce better milk. They use a small opening in the top of the pail, and most of the top is covered. It is a pail that is becoming quite common in many of our city dairies.

This picture shows a group of milkers of one of our dairies around New York City. You see they are dressed in white, everything about the place is kept clean and tidy. Wide-top open pails are specially devised to catch all the dirt that comes from the cow's flank, and keep it in the pail. When we talk about using different pails, people say we cannot do it; but it can be done.

Here is a pail with a hood on it, and any dirt that falls from the cow falls outside of the pail, instead of into it. Every seam in milk-pails should be flushed full with solder, so that a brush can get into every part of the pail in order to thoroughly clean it. Do not use a dish-cloth for washing a pail; use a brush.

We recently carried on a series of experiments. Our dairyman took a regular milker he had in the barn, and then took a student of bacteriology and put him in there with the regular man. He had studied bacteriology, and knew how to avoid getting dirt into the milk; and the milk fresh from his milking contained only 2,455 bacteria per c.c., and the regular ordinary farm hand as we find on our farms, with the same kind of pails and utensils, had 17,105 bacteria per c.c. The man who milks has got to have some brains of his own, and he has got to known just what to do in order to get clean milk. It is quite a common thing among dairymen that the cows do not give down their milk until you feed them; and the farmers will tell you you ought to milk first and feed next. You can train the cows just as you wish, and it makes quite a difference in the bacterial contents of the milk. In this case there are a little over 2,000 bacteria per c.c. where they are milked before feeding, and where they are milked after there 3,506, that comes from the dust in the air that is stirred up by feeding.

By wiping the cows off before milking them you help to produce clean milk. There was 7,000 bacteria per c.c. from cows with the unwiped udder, and where the udders were wiped there was only 716 bacteria, and that is quite a difference.

The open pail produced 3,439,200 bacteria per c.c., and the covered pail, under exactly the same conditions, only 103,600.

A good many of you people drink milk, and if you look in the bottom of the glass you will see the dirt around the bottom. Should that not be avoided?

In rinsing milk utensils with boiling water we simply cook the milk on the edge of the vessel. They should be first rinsed in warm water; then use the boiling water. There is no germ killer so good or so strong as the pure sunlight, and it is the cheapest. Water that you can bear your hands in does not destroy the germs in milk vessels.

This picture shows a milk sterilizing oven. The milk utensils are placed in the oven and the door is closed and high pressure steam is turned in there for ten or thirteen minutes, so that these utensils become thoroughly hot, and that destroys the germs. That is not possible on a farm. The

best thing to do on a farm is to boil every milk utensil you have. If you can put the utensil in the water and keep it there till the water boils you have the best thing. Many people object to using boiling water because they cannot put their hands in. If you persist in using water that you can put your hands in you are not going to get clean vessels.

No milk plant can take bad milk and make it pure. You have got to get at the farmer who produced the milk. Every hour you add to the life of the milk it is growing poorer and poorer. We must shorten the time between its production and its use. Milk must be cooled thoroughly in order to keep it in right condition. Milk, as it was devised by nature, never was intended to see the light of day; milk is produced for the suckling of the young, and there is no interval between the drawing and its consumption. The whole question of the producing of milk when you have a clean healthy cow is what the man can do. It must necessarily cost more to produce milk in a clean condition than it does in a dirty way. One of our veterinaries made the statement that the farmers were only paid for taking care of the milk as they do to-day. I do not believe clean milk should be produced for the same price as the ordinary run of our milk is sold for. If the consumer can be assured that every bottle of milk bought is absolutely pure and free from disease I do not believe they are going to object to paying one or two cents more per quart.

We are not going to make butter and cheese out of milk that has been condemned and unfit for domestic purposes. We are going to insist on cleanly methods. It is going to cost the farmer more money, but it is going to add profits to the farmer. It is up to the farmers to see that their cows do better, and that they do better with their cows; and the cleaner the methods you pursue the better it will be, and the more profit the farmer will make. (Applause.)

FOOD VALUE OF MILK AND ITS PRODUCTS.

By Prof. R. Harcourt, O.A.C., Guelph.

If the true value of milk as a food were more fully appreciated, it would be used much more freely. Chemical analyses and experience prove that among our food materials there is none more wholesome than good pure milk. It is cheap, palatable, easily digested, and highly nutritious. Its value as an article of diet for children and invalids is fully recognized; but for adults in good health it is too frequently regarded as a luxury to be used as a condiment with tea, coffee, fruit, and as an adjunct in cooking. Milk is, however, not only a condiment and beverage, but a food, and a very valuable one.

On the other hand, the very qualities which make milk such a desirable food also render it undesirable from another standpoint. It is a particularly fine medium for the growth of bacteria; and, as a result of the manner of its production and the way it is commonly handled, it is subject to contamination with bad flavors, dirt, and all the myriads of germs usually associated with the dust that accumulates in the stable.

The consumer has a right to demand that milk furnished him shall be clean: that it will keep at least twenty-four hours after it is received, if kept at a temperature of 60° F. or below: that the flavor be not injured by improper feeding, careless methods of handling, or by the development of bacteria which cause bad flavors; that it contain no disease germs, or any form of preservative; and that the milk have a certain known composition which is uniform from day to day.

Milk contains all the ingredients required to nourish the body; that is, furnishes the materials which build up the body and keep it in repair, and also those which supply it with fuel to keep it warm, and to furnish the animal machine with the energy to do its work.

The best foods are those which perform these various functions in the most thorough and complete manner. We usually judge of the value of a food by several different standards. Thus, it must contain the constituents which are required by the body in proper amounts, it must be digestible and palatable, and it must be reasonably cheap.

Some foods contain all the ingredients required by the body; that is, protein, fat, carbohydrates, and mineral matters. The protein is used to form the tissues and fluids of the body, such as muscle, blood, bone, and brain; to repair their waste; and, if eaten in excess of the daily requirements, may be stored in the body as fat and drawn on as required for future consumption. Familiar examples of protein are lean meat, white of egg, casein of milk and cheese, and gluten of flour. The fats of foods, such as lard, fat of milk and butter, and the fat or oils of vegetable foods, are used as a source of energy, and if used in excess may form fat on the body. The starch, sugar, and cellulose are examples of carbohydrate bodies, and are generally speaking the cheapest source of heat and energy in the body. They may also be transformed into body fat. The mineral matter of a food is absolutely essential for the formation of bone and is also present in the tissues and fluids of the body.

The protein, fat, and carbohydrates may be oxidized or burned in the body, and the heat which they will produce is frequently used as a basis for comparison of the value of foods. Unfortunately this does not give us an entirely satisfactory basis for comparing the nutritive value of foods, for the protein is absolutely essential for the formation of flesh and yet has a low fuel value. It is equally true that it would not be just to make the comparison on the basis of the protein content alone, as the fat and carbohydrates are valuable nutrients. Taking all things into consideration, possibly a statement of the amount of energy a food is capable of producing is the best basis upon which to compare the nutritive value of foods, especially when they are arranged in a properly balanced dietary.

In order that we may have some measure for expressing the amount of heat that a given substance is capable of producing, the calorie is taken as the unit. Roughly speaking, a calorie is the amount of heat required to raise the temperature of one pound of water 4 degrees Fahrenheit. If one pound of starch or sugar is burned and all the heat utilized, it will furnish enough heat to raise 1,860 pounds of water 4 degrees in temperature. The fuel value of protein as it is ordinarily burned in the body is nearly the same as that of carbohydrates, but fat will give about 2.25 times as much heat as protein or carbohydrates, or 4,220 calories per pound.

It has been found that a man required a certain amount of protein, fat, and carbohydrates in his daily food, and that these ingredients combined should furnish approximately a certain number of calories of heat. The quantity of these several nutrients required will, if necessity, vary with the amount of energy exerted in the performance of work. Any food which will furnish all the nutrients in the right proportion to supply the needs of the body and in a digestible and palatable form, that is, not too bulky, and at a moderate cost, is a complete food. Unfortunately we have very few foods which will answer all these requirements, and if we had, it is quite probable that the monotony of the diet would soon render them so distasteful as to destroy their usefulness.

Milk is frequently spoken of as a complete food. It is to the infant, but for the adult it does not contain enough carbohydrates, and is too bulky. Wheat bread more nearly fulfills the requirements for a full grown person, but it is a little deficient in protein. Possibly oatmeal comes the nearest to being a complete food for the adult. It certainly has the advantage of being cheap.

But, as is well known, the food of man must please the palate as well as satisfy the demands of the body, and to secure this we resort to a very varied and mixed diet. It is not the intention to deal at this time with a great variety of foods, but to show which of our common foods furnish the most protein, fat, and carbohydrates for the least money, and to show where milk and its products stand as compared with some of the meat and vegetable foods.

For purposes of comparison the number of pounds of protein, fat, and carbohydrates, and the number of calories of heat which one dollar's worth of some of the more common foods will furnish has been calculated and are presented in the following table:

PROTEIN, FAT, CARBOHYDRATES, AND FUEL VALUE OF $1.00 WORTH OF EACH FOOD.

——	Price per lb.	Refuse, per cent.	Protein, pounds.	Fat, pounds.	Carbohydrates pounds.	Fuel value, pounds.
Milk	6c. quart	.....	1.38	1.69	2.21	13,809
"	8c. "	.....	1.04	1.27	1.66	10,402
Skimmed milk	10c. gallon	.....	3.4	.30	5.1	17,070
Buttermilk	10c. "	.....	3.0	.50	4.8	17,362
Butter	25c. pound	.....	0.04	3.4	.....	14,422
Cheese	17c. "	.....	1.63	2.16	.24	12,593
Beef, fore quarter	6c. "	18.7	2.41	2.91	.....	16,762
" hind quarter	8c. "	15.7	1.92	2.29	.....	13,235
" flank	8c. "	10.2	2.12	2.37	.....	13,944
" Sirloin	18c. "	12.8	.92	.90	.....	5,509
Veal, cutlets	15c. "	3.4	1.34	.50	.....	4,612
Mutton, chops	16c. "	16.0	.84	1.80	.....	9,158
Lamb, hind quarter	18c. "	15.7	.92	.90	.....	5,509
Ham, smoked	18c. "	13.6	.79	1.85	.....	9,276
Ham, smoked and cooked	30c. "	.....	.67	.75	.....	4,405
Eggs	25c. dozen	11.2	.71	.56	.....	3,853
White Bread	2½ lbs. 10c.	.....	2.10	.5	12.2	28,710
Rolled Oats	7 " 25c.	.....	3.5	1.9	20.0	51,730
Farinas	6 " 25c.	.....	2.3	.24	18.7	40,070
Potatoes	90c. bag	20.0	2.18	.10	15.6	33,492

No attempt has been made to calculate the amount of digestible constituents, but it is probable that over 95 per cent. of the protein of the milk and meats, and about 80 per cent. of that of the cereals would be digested. The fat of the cereals would be less digestible than that of the milk and meats, and sugar of the milk would be almost entirely absorbed, while a considerable proportion of the carbohydrates of the bread and oatmeal would resist the action of the digestive juices. It is also quite probable that more energy would be required to digest the vegetable foods.

Taking the figures as they stand, it is evident that milk does not furnish protein and fat as cheaply as beef bought by the quarter, but it does supply

more of these constituents than the various cuts of the meats. Skimmed milk and buttermilk are particularly cheap sources of protein, and are probably the cheapest source of this constituent among all our foods. Butter is valuable almost entirely for the fat it contains, and as an energy producer is as cheap as any of the meats. The food value of well-ripened cheese is too often overlooked. We have frequently found that nearly 50 per cent. of the protein of cheese is soluble in water when the cheese is ten or eleven months old. This would mean that it would be comparatively easily digested and in this respect it would be quite different to the green or unripened article. It should be further noticed that there is no refuse with the milk and its products.

It is not necessary to dwell more fully on the data presented in the table. It is evident that milk at 6 or 8 cents a quart is a cheaper source of the nutrients than meat as ordinarily retailed, and, if we allow for the refuse, nearly as cheap as when meat is bought by the quarter. Furthermore, it is certain that milk and its products used along with the cereals are a cheap source of the nutrients and energy, and that when the two are used together a sufficient supply of all the essential constitutents for growth and repair of the tissues of the body and for work can be obtained without the use of the more expensive meats.

PRESENTATION OF TROPHY AND MEDALS.

Mr. G. C. CREELMAN: I am not sorry that Mr. McLaren is not here tonight, because it gives me the opportunity of my life, for the first time, to present to a lady this beautiful trophy which has been offered for the best cheese in the show. It has been offered for a number of years. I find by the programme that for five years it has been offered under these conditions: "A Challenge Cup, valued at the sum of $150, to be the property of the exhibitor of cheese at the Winter Dairy Exhibition who shall receive the highest score three times, or in two successive years." This year it is my privilege as well as pleasure to present it to Miss Mary Morrison, of Perth County. I hope Miss Morrison, in taking this beautiful trophy to her own home, will keep it not only for this, but for the next and the succeeding year, and that it will become her property. I am sure it will become her property, not only with the consent, but with the greatest delight of the people of Western Ontario. (Applause).

Miss MORRISON: I desire to thank the cheese buyers for this beautiful trophy. I never expected such an honor would be conferred upon me. I can assure you I prize it highly and will do my utmost to keep up the reputation I have won. I am sure it is more than I deserve. I thank you very kindly for the presentation. (Applause).

G. C. CREELMAN: The Silver Medal presented by Ryrie Brothers of Toronto, has been won by Mr. Thompson, of this county; and it gives me pleasure to present this beautiful medal at this time. (Applause).

Mr. THOMPSON: I feel very grateful for this presentation. I never expected to be the winner. I tried last year, and took second place. This year it has come to my lot to be the first place, and to receive this beautiful medal. I thank you very much. (Applause).

Mr. CREELMAN: The second prize is a Bronze Medal presented by the Ryrie Brothers, won by Wm. Pierce, of Oxford County. May we hope that his success will lead to greater things next year, and that Mr. Pierce will be able to win the first medal. I have much pleasure in presenting you with this bronze medal.

Mr. Pierce: I thank the Association, and like Mr. Thompson, I did not expect it. In fact, I did not know anything about it until the latter part of October, and I thought I had a pretty poor show. I am very thankful to get it, and will probably do better in the future. I thank the donators and members of the Association, and wish them every success. (Applause).

THE SHEPHERD OF THE SOIL.

By G. C. Creelman, O.A.C., Guelph.

"The shepherd of the soil is near to God,
Because he tends the Bounteous Mother Earth;
His feet are wont to touch the cooling sod;
He reads the face of nature from his birth.
The showers and the sun come in their place
To aid the work of this fond shepherd's hands.
The sweet content of life his vision brands
With peace, that gives his toil an added grace.
To him is given to see the Bounteous Hand
In all the gifts the earth so freely gives.
To him there comes a love for all the land;
And for God's children that from it must live.
Let us give reverence to this son of toil
For he is God's own shepherd of the soil."

I am pleased to-night to see so many people from the county of Oxford present. Their presence indicates their interest in the subject, and shows that agriculture is every year assuming a more important place in the eyes of town and city people, as well as people immediately interested in the business. The individual is the all important factor in agriculture, as in any other walk in life. What we want is:

(1) Not Better Cows but Better Feeders. The average cow in the Province of Ontario is said to give something less than 3,000 pounds of milk, and yet one cow in our College herd last year produced 20,778 pounds. I think I hear some one say that if they had the Government supply the feed and the feeder, they also could make more out of their cows; but I ask, "Is this true?"

James Leask, a very plain farmer in Eastern Ontario, bred, fed, and produced at his own expense a great Shorthorn steer in 1907. This steer he took to the great International Exposition at Chicago, and there won first place in his class, first place in his year, and first place over all competitors as Grand Champion in the Show. The Government had nothing to do with it; and yet this man, by superior judgment in selection, careful handling, and feed, was able to make for the Province of Ontario a very enviable reputation and to win some $1,400 in prizes.

We have a pretty good class of cows in Ontario, both east and west of Toronto, and where they are given a show they make pretty good returns. It is also true that no country in the world has a better reputation for the growing of good feed for cattle. With the cows and the feed, therefore, does it not surprise you that more of our men do not get larger returns from their dairy herds? Clearly it is the feeder that is at fault, and it is to him that I appeal for better methods and more system in his work.

(2) Not Bigger Farms But Better Farming. The difference between the average and possible crop is yet about 300 per cent. Some years if it is dry, many of our farms fall far below what they should do, if they were well farmed. The past season has shown many striking examples of this fact, viz., that the farmers who farmed well suffered very little from the drouth.

in comparison with those who farmed in a hap-hazard way. There are men in this country with seventy-five acres of land that are actually making more money in a year than others with farms of one hundred and fifty acres, with the soil originally of as good quality. Catch crops, crops to supplement the pasture, maximum production of forage so as to keep the maximum amount of stock, these are the things that go to build up a good farm and make it more valuable from year to year.

(3) Not More Breeds of Live Stock but Better Strains. Hardly a week passes but what we get inquiries as to what is the best breed of cattle, or horses, or sheep, or swine, or chickens, or ducks, for the farmer to raise. Each breed has its own good points, and some men would get only average returns from the very best bred animals, while others might take ordinary animals and by careful selection and good feeding soon raise up a herd as valuable and make more money each year. A better knowledge of the business is what is wanted; that is, a more exact knowledge. Sentiment plays no part whatever in the dairy business, except as a man gets to love his stock as he handles it; but a good natured beef cow that is quiet and easy going, and gives no trouble but eats a lot and produces but little has no place in the herd. We must know what every animal is doing and force each one to do its best. Then, if its best is not good enough, it must be sent to the butcher's block and a better one put in its place.

(4) Not Better Implements and Utensils, but a Better Knowledge of How to Use Them and How to Repair Them. It is hardly necessary for me to speak upon this subject, for you know just what I must say. Put the very best implements in the hands of a careless farmer and in one season they will be unfit for their best work. In the hands of another man, who exercises care, implements last a long time; but more than that, they are always in shape for their work, on short notice. Where every farm operation is done as far as possible at the time that it should be done, then you have the saving of good interest on your money; while on the other hand, where matters are delayed beyond the right time, then a large portion of the farmer's work, up to that time, goes for nothing.

(5 Not Bigger Barns and Stables, but Better Arranged and Better Ventilated Ones. Stables badly arranged, where the feed has to be brought a long way, and where labor saving machinery has not been introduced, makes the feeding and handling of cows very laborious indeed. Also, where stables are badly ventilated, there is not much chance to get pure milk, and the cows cannot thrive. If you have learned anything at this Conve tion about ventilation or remodelling of your buildings, then you ought to go home and put it into operation at once. Cut doors and windows where they will be handiest, and close up doors and windows where they are useless. Put in cement floors, and do the work yourself. Find out what is the best system now in vogue, by correspondence, and then be satisfied with nothing else. You will be surprised when you start a system of improvement how it will extend throughout your whole farm and how soon you will begin to reap the benfits, both in increased returns and the accomplishment of much more work in a given time.

In conclusion, let me say that if it be true: (1) That one-quarter of our cows are unprofitable; (2) That the average yield of our crops is but one-third of what it might be; (3) That our soils in many places are being worn out and are incapable of producing as large crops from year to year; (4) That we are using Patent Stock Foods at high prices that we might mix ourselves; (5) That in the using of broken seeds and small shrunken seeds

our crops are reduced one-half; (6) That every stone pile and stump and wet place in the field reduces our acreage but not our labor; (7) That rich land too wet to plant early will pay for tile drainage in three years from the increased crop alone; I say, if all these things are true, then we should use every effort to make a change, that this country may improve from year to year, and that the high intelligence which characterizes the farming classes of this country may bear fruit one hundred fold.

George Smith, M.P., Woodstock, was the last speaker. He dwelt on the revolution of the past decade in farming processes. Necessity is the mother of invention, he said, and the implements were invented after bright minds saw what was needed. He contrasted in a very vivid manner the old fashioned methods with the new. He described the history of the threshing machine from the old clumsy flail to the fine steam thresher and its funnel for blowing straw to any place desired, in use at the present day. He also dwelt upon the revolution of the reaping machine. Wherever a man looks now-a-days he sees progress on every hand. Fences had improved, schools had improved, and the methods of fertilization of the soil had also advanced in proportion. He closed an excellent address by stating that while we see these evolutions and the wonderful improvements and methods of cultivating the soil taking place we must not forget the old pioneers who did so much for this country in the early days. We should be proud to trace our descent from these old pioneers who did so much to make the improvements of the present time possible.

RESOLUTIONS.

Mr. J. J. Parsons presented the following resolutions, all of which were adopted: "That, whereas, the success and educational value of this Convention, and the interest taken therein, is due in a marked degree to the presence of the speakers who have so kindly addressed our meetings, we desire to express our sincere thanks for their assistance and presence throughout the various sessions."

"That we, the members of this Association, desire to express our appreciation of the kindness of the Mayor, Board of Trade, and citizens of Woodstock in furnishing the use of the Opera House and Market Hall, together with the excellent musical part of the programme, free of charge for the Convention and Dairy Exhibition."

"That the thanks of the Convention be, and they are hereby tendered, to the Canadian Salt Company of Windsor, Ontario, through their general Manager, Mr. Henderson, for the very handsome medals and badges presented by the company to the members of this Association."

"That we, as Dairymen, feel that we are under great obligations to the Department of Agriculture for the assistance they have rendered the dairy industry through the system of instruction that has been given, and also in providing speakers to attend annual meetings of cheese factories and creameries free of all cost to the dairymen."

"That as an Association, we wish to express our great satisfaction with the work of the special officer appointed to take charge of the work regarding the adulteration of milk, and we recommend to the Board of Directors for 1908 the continuation of his services."

The Convention was then declared closed.

APPENDIX.

THE MILK, CHEESE AND BUTTER ACT.

(Assented to April 14, 1908.)

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

Standard of Milk in Creameries.

Interpretation

1. This Act may be cited as *The Milk, Cheese and Butter Act.*

Standard for milk for manufacture of butter in creameries.

2. All milk containing less than thirteen per cent. of total solids, of which three and three-quarters per cent. must be chemically dry butter-fat, shall be deemed below the standard required in creameries for butter manufacture. R.S.O. 1897, c. 251, s. 1.

Power to make rules.

3. The owners or board of management of any creamery in the Province of Ontario, may make such rules and regulations as may be advisable for the due carrying on of the business of the creamery. R.S.O. 1897, c. 251, s. 2.

Rules to be binding on patrons, etc.

4. The patrons of all creameries may be required to subscribe their names to such rules and regulations, and the rules and regulations shall be binding on the patrons, owners and board of management who have so subscribed. R.S.O. 1897, c. 251, s. 3.

Prevention of Frauds.

Right to test milk.

5. It shall be lawful for the owner or manager of a cheese or butter manufactory to require the owner or custodian of any cow or cows whose milk is being bought for, or supplied or sent to, the manufactory, to submit such cow or cows at his farm or other premises where such cows are usually kept, to such milk test, by persons named by such owner or manager, as may be necessary for the said persons to ascertain the quantity and quality of the milk of such cow or cows, on any day, and at such time on any such day as may be appointed by said owner or manager, and in case the owner or custodian of the cows refuses to so submit them, or obstructs in the execution thereof the persons engaged in making the milk test, or interrupts the test, or interferes in any way with the test, or the application of its result, he shall, on complaint before any Justice or Justices of the Peace, forfeit and pay for every such offence a sum of not less than $10 nor more than $100, in the discretion of the Justice or Justices of the Peace who may hear such complaint, together with the costs of the prosecution, if so ordered, and in default of payment of the penalty and costs, shall be liable to be committed by the convicting Justice or Justices of the Peace, to the common gaol of the county, with hard labour for any period not exceeding six months or until said penalty and the costs of enforcing same are sooner paid. R.S.O. 1897, c. 251, s. 4.

Interfering with test.

Right to take samples of milk.

6. It shall be lawful for the owner or manager of any cheese or butter manufactory who suspects any person of selling, supplying, sending or bringing milk to the manufactory, of any offence under this Act, to enter upon or to appoint some person or persons to enter upon, and such appointed person may enter upon the premises of the suspected person, with or without notice, and take samples of milk from the cow or cows from which the supposed offender was or had been immediately before then procuring the milk or part of the milk so sold, supplied, sent or brought as aforesaid; and any such suspected person who obstructs or refuses to permit the taking of any such sample shall, on conviction thereof, be liable to a penalty of not less than $10 nor more than $50 with costs of the prosecution, and in default of payment thereof, shall be liable to be imprisoned in the common gaol of the county in which the offence has been committed for a period not exceeding three months with hard labour. R.S.O. 1897, c. 251, s. 5.

Interfering with taking of samples.

Notice to be given when milk diluted etc.

7. No person shall sell or offer for sale in any city, town or incorporated village, and no person shall sell or supply under contract to any person in any city, town or incorporated village, and no person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager

thereof, milk diluted with water, or in any way adulterated, or milk from which any cream has been taken, or milk commonly known as "skimmed milk," or milk in which any preservative is contained, without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory, or the person or persons to whom it is sold in cities, towns, or incorporated villages, that the milk so sold, supplied or brought to be manufactured or otherwise disposed of, has been so diluted with water, or adulterated, or had the cream so taken from it, or become milk commonly known as "skimmed milk," or has had a preservative added to it, as the case may be. R.S.O. 1897, c. 251, s. 6, *amended*.

Notice to be given when any part of milk is kept back.

8. No person who, in the course of his business agrees to sell, supply, bring or send to any cheese or butter manufactory, or the owner or manager thereof, to be manufactured, the milk of any cow or cows, shall in the course of such dealing and business, keep back any part of the milk of such cow or cows without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory what portion of the milk he has so kept back. R.S.O. 1897, c. 251, s. 7.

9. Notwithstanding anything contained in this Act, no person shall be subject to any penalties under this Act for selling in any city, town or incorporated village milk from which any of the butter, fat or cream has been removed, provided the milk so sold or offered for sale is advertised as "skimmed milk" and the person to whom the milk is sold is informed that the same is "skimmed milk." (*New.*)

Notice to be given when milk tainted.

10. No person shall sell, supply, bring or send to a cheese or butter manufactory, or owner or manager thereof, to be manufactured, any milk that is tainted or partly sour without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory of such milk being tainted or partly sour. R.S.O. 1897, c. 251, s. 8.

11. No person supplying milk or cream to a cheese factory or creamery, or for sale in cities, towns or incorporated villages, shall keep his dairy, milk house, milk stand, or any vessels or equipment used for the storing or the carrying of milk or cream, in an unclean or unsanitary condition. 6 Edw. VII. c. 48, s. 1, *amended*.

Cheese factories to be kept clean.

12.—(1) Every cheese factory and creamery manufacturing butter or cheese for public use or sale, and the premises upon which milk or cream is offered for sale and the surroundings of every such cheese factory and creamery and premises shall be kept in a clean and sanitary condition, and all the water used therein for the manufacture of any dairy products must be clean and pure.

Penalty.

(2) The owner or manager of any cheese factory or creamery or premises upon which milk or cream is offered for sale refusing or neglecting to observe the provisions of this section after being warned or advised by a dairy inspector, shall, upon conviction thereof before any Justice or Justices of the Peace, forfeit and pay a sum of not less than $50 nor more than $200, together with the costs of prosecution, and in default of payment of such penalty and costs shall be liable to be committed to the common gaol of the county with hard labor for a period not exceeding six months. 6 Edw. VII., c. 48, ss. 2 and 3, *amended*.

Appointment of inspectors.

13. Upon the recommendation of the Minister of Agriculture, the Lieutenant-Governor in Council may appoint one or more persons as inspectors for the enforcing of the provisions of this Act, who shall be known as Dairy Inspectors. The Lieutenant-Governor in Council may determine the remuneration to be paid to such inspectors. 6 Edw. VII., c. 48, s. 4.

14. All dairy inspectors appointed under this Act shall have free access and admission to all cheese factories and creameries and the premises upon which milk or cream is offered for sale located within the Province and to all the lands adjoining the same, and to the premises of all persons supplying milk or cream to any cheese factory or creamery, or for sale in cities, towns or incorporated villages; they shall also be empowered to take and test samples of milk found in cheese factories or creameries or in the possession of milk dealers having the same for sale in cities, towns or incorporated villages, or in transit between producers and cheese factories and creameries, between producers and dealers or between dealers and consumers in cities, towns or incorporated villages; and they shall have the right to take and test samples of milk found upon the premises of producers supplying milk to cheese factories or creameries or for sale in cities, towns or

incorporated villages, and may take and test samples from cows which have been producing milk to be sold to cheese factories or creameries or to be delivered for sale in cities, towns or incorporated villages, and any person refusing admission to the same or offering obstruction to the work of inspection or the taking of samples or testing of same shall be subject to the penalties provided in section 15. 6 Edw. VII., c. 48, s. 5, *amended*.

Report of inspector

15. Every inspector appointed under this Act shall make such reports and in such form as the Minister may direct. 6 Edw. VII., c. 48, s. 6.

Penalty for violations of ss. 7, 8, 10, 14.

16.—(1) Any person who, by himself, or by his servant or agent, violates any of the provisions of sections 7, 8, 10 or 14 of this Act, upon conviction thereof before any Justice or Justices of the Peace, shall forfeit and pay a sum of not less than $5 nor more than $50, together with the costs of prosecution, in the discretion of the Justice or Justices, and in default of payment of such penalty and costs, shall be liable to be committed to the common gaol of the county, with hard labor, for any period not exceeding six months, unless the said penalty and the costs of enforcing same are sooner paid.

Evidence for violations of ss. 7-8.

(2) For the purpose of establishing the guilt of any person under the said sections, 7 or 8 of this Act, it shall be sufficient *prima facie* evidence to show that such person, by himself, his servant, or agent, sold, supplied, sent or brought, to be manufactured, to any cheese or butter manufactory, milk substantially below the standard of that actually drawn, or by the accused represented as having been drawn from the same cow or cows within the then previous or subsequent two weeks, provided the comparison or test is made by means of a lactometer and Babcock Tester, or by some other adequate means of making the comparison.

Secs. 7, 8 and 10 not to apply where defendant shows want of knowledge.

(3) The said sections 7, 8 and 10, shall not apply where the person charged with the offence proves to the satisfaction of the Justice or Justices of the Peace that the alleged offence was committed by some person or persons other than a member of the family of the person charged with the offence or was committed by some person or persons other than his servant or agent, and also that the offence was committed without his knowledge and consent. (*New.*)

Description of offence in information or complaint.

(4) In any complaint made or laid under said sections, 7, 8, 10 or 14 of this Act, and in any conviction thereon, the milk complained of may be described as deteriorated milk, without specification of the cause or mode of deterioration, and such description shall be a sufficient description of the offence to sustain a conviction, and in any complaint, information or conviction under this Act the matter complained of may be declared, and shall be held to have arisen within the meaning of *The Ontario Summary Convictions Act*, at the place where the milk complained of was to be manufactured, notwithstanding that the deterioration thereof was effected elsewhere. R.S.O. 1897, c. 251, s. 9, *amended*.

Appropriation of penalties.

17. Any pecuniary penalty imposed by the preceding section in respect of selling, supplying or bringing milk to a cheese or butter manufactory, shall, when recovered, be payable one-half to the informant, and the other one-half to the owner, treasurer or president of the manufactory to which the milk was sent, sold or supplied for any of the purposes aforesaid in violation of any of the provisions of this Act, to be distributed among the patrons thereof in proportion to their respective interests in and profits thereof. R.S.O., 1897, c. 251, s. 10.

Fraudulent use of cream of milk supplied. Penalty.

18.—(1) Any butter or cheese manufacturer who knowingly and fraudulently uses, or directs any of his employees to use for his or their individual benefit, any cream from the milk brought to any cheese or butter manufactory, without the consent of all the owners thereof, shall, for every offence, forfeit and pay a sum not less than $1 nor more than $50, in the discretion of the Justices before whom the case is heard.

Conviction and levy of penalty.

(2) Any two or more Justices of the Peace, having jurisdiction within the locality where the offence has been committed, may hear and determine such complaint upon the oath of one or more credible witnesses, and shall have power, in case the penalty and costs awarded by them are not forthwith paid upon conviction, to levy the same by distress and sale of the goods and chattels of the offender, by warrant under their hands and seals or the hands and seals of any two of them, and the penalty, when recovered, shall be paid over by such Justices, one-half to the person complaining, and one-half to the treasurer of the municipality, district or place where the offence

In default of distress imprisonment.

has been committed; and in default of payment or sufficient distress, the offender may, by warrant signed and sealed as aforesaid, be imprisoned in the common gaol for a period not less than one day nor more than twenty-five days, at the discretion of such Justices, or any two of them, unless such penalty, costs and the charges of commitment are sooner paid.

Civil remedy.

(3) Any party aggrieved by such fraudulent conduct as aforesaid may at his election sue the offender in any Civil Court of competent jurisdiction, and recover from him the amount of damages sustained, and levy the same with the costs according to the ordinary practice of the Court in which such action is brought. R.S.O., 1897, c. 251, s. 11.

Proviso as to Justices interested.

19. No Justice or Justices having any pecuniary interest in a cheese or butter manufactory as aforesaid, shall hear or determine any complaint under this Act. R.S.O., 1897, c. 251, s. 12.

Rev. Stat., c. 251 repealed.

20. Chapter 251 of the Revised Statutes of Ontario, 1897, and amendments thereto are repealed.

DAIRY SCHOOLS OF ONTARIO.

GUELPH DAIRY SCHOOL.

Notes on Dairy School, 1908.

The Staff in connection with the Dairy School at the Ontario Agricultural College, 1908, consisted of the following:

Prof. H. H. Dean, B.S.A.....Dairy Husbandry.
R. W. Stratton .....Instructor in Separators.
Fred Dean .....Instructor in Buttermaking.
Alex. McKay .....Instructor in Cheesemaking.
C. H. Ralph .....Assistant Instructor in Cheesemaking.
Geo. Taylor.....Instructor in Milk-Testing.
Geo. Travis .....Instructor of Boilers, Engines, etc.
Miss Laura Rose .....Instructress in Farm Dairy.
Prof. S. F. Edwards, M.Sc.....Bacteriologist.
J. Fulmer .....Instructor in Dairy Chemistry.

The attendance during the regular course was 52, and during the special courses for milk-testing and instructors, 25, making a total of 77. There was a large demand during the term and at the close for all students who had done good work during the term. There was no difficulty in obtaining positions at from $50 to $65 per month.

More time this year was devoted to the subjects of chemistry and bacteriology, and the practical laboratory courses in these two subjects were very satisfactory to the class. Dairymen are beginning to realize, more and more, that these two sciences are at the basis of successful dairying, and must receive more attention from dairy students than they have ever had before. Special instruction was also given during the month of March on handling steam boilers, engines, piping, soldering, etc. This is practical instruction which is very helpful to men in factories.

The examinations at the end of the term were spread over the last three weeks of March instead of coming the last three days as has been the custom in the past. The results were more satisfactory.

In 1909, the course will be similar to that given in 1908, but we expect to add one month's instruction in "soft" cheesemaking. This is an important branch of dairy work, and if these cheese are properly made, there is no difficulty in securing a good market at profitable prices.

On the whole, the term for 1908 was one of the best which has been held for some years. Instructors and students took a very active interest in the work, and all agreed that it was three months profitably spent.

KINGSTON DAIRY SCHOOL

Session of 1907-8.

In making this report for insertion in the Annual Report of the Dairymen's Association, much of what they have to say must, of necessity, be curtailed. A fuller report is being prepared for the Department and will likely appear in bulletin form.

Staff.

J. W. Mitchell, B.A.....Superintendent.
J. W. Mitchell .....Dairy Lectures.
G. G. Publow .....Instructor in Cheesemaking.
J. H. Echlin .....Assistant in Cheesemaking.
Jas. Stonehouse .....Instructor in Buttermaking and Separators.
J. Buro .....Assistant in Separators.
W. W. Dool .....Assistant in Buttermaking.
J. F. Singleton .....Instructor in Milk Testing.
W. T. Connell, M.D. .....Bacteriology.
W. L. Goodwin, D.Sc.....Dairy Chemistry.

We shall divide the report into two parts:
1. School work proper, or teaching and instruction work.
2. Experimental and investigation work.

School Work.

In the early years of the school the work of the session was divided into a number of short courses—and quite properly so. Feeling, however, that the time was at hand when every cheese and butter maker should have a thorough dairy school training, we began dropping out these short courses in order to lengthen the long course and during the session just closed there were just two courses given. viz., the Long Course, practically three months in length, and, following this the Instructors' Course for Syndicate Instructors. This enabled us to offer a thorough course to those who wished to remain throughout the Long Course and take the final examinations at its close. In our calendar we distinctly announced, however, that anyone who wished to take a short course in the school would be privileged to do so at any time during January and February, or the first two months of the Long Course. Thus short courses were really provided for while provision was made for materially lengthening the long course. We found this plan to work admirably.

In many respects the session just closed has been a most satisfactory one. Sixty-one students registered during the Long Course and remained a longer or shorter time, and twenty-three students took our Instructor's Course, making a total registration, in all, of 84 students. A goodly number of the Long Course students remained to the end and took the final examinations.

Never in the history of the school have we received a more satisfactory supply of milk and cream, although we were compelled, owing to the great scarcity and abnormally high price of goods, to pay an exceptionally high price for our milk supply.

The school opened as a creamery on November 12th and continued as such to the end of December, ran as a school during the months of January, February and March, and was again operated as a creamery up to the tenth of April.

In the work of the Long Course were comprised the following subjects: Dairy science (including the farm side of dairying), cheesemaking, buttermaking, separators, milk-testing, dairy bacteriology, dairy chemistry (lectures and laboratory work), boilers and engines, and soldering and pipe-fitting. The students were required to stand the test of both practical and written examinations, which covered all the subjects indicated.

EXPERIMENTAL AND INVESTIGATION WORK.

New Cream Bottle for Babcock Test: During the past year we brought out a modified form of cream test bottle. The trouble with the old style of cream bottle, which is graduated for reading for 18 grams, is, that by the time 18 grams of cream are taken and a little water and the necessary amount of sulphuric acid added, the bowl of the bottle is so full that there is no room for shaking the bottle and properly mixing the contents; and, furthermore, a sufficient quantity of water cannot be added to insure against charred readings. The new style of bottle devised by us, while it has the same size of bowl as the old, has a smaller neck, graduated to read per cent. of fat for 9 instead of 18 grams. Its advantages are obvious. One can take 9 grams of cream and add 9 c.c of water and the usual amount of acid and still leave plenty of room for readily mixing the contents, while the large amount of water added prevents the sample from charring—two decided advantages.

Moisture Test: For a long time practical dairymen have felt the necessity for a practical moisture test. Mr. W. O. Walker, of the School of Mining and lecturer of dairy chemistry in our school, and the writer made a thorough and exhaustive investigation of this subject and examined the different tests in use, and decided that each lacked, in one respect or another, the essentials of a practical moisture test for curd, cheese and butter. A test, to be practical, must be reasonably accurate, rapid, simple and inexpensive to operate, easy to clean, durable, easily and cheaply kept in repair and moderate in price. They undertook to devise such a test and feel that they have succeeded in doing so. As a full description and cut of it will appear in bulletin form, it will suffice, at present, to say that it is reliable and speedy, easy to conduct, can be operated at a small cost and is equally satisfactory for determining the moisture in curd, cheese and butter, while the apparatus is practically all metal and hence very durable.

The Making of Butter from Whey: During the session just closed we made a study of the making of butter from whey, and although we are not prepared to speak finally upon the subject, we feel that we gleaned some information which will prove of interest.

On different occasions we ran our separators with a view to determining *the fuel cost of elevating and separating the whey.* Water was used for this purpose as it has practically the same consistency as whey. Each test extended over a period of three hours. We ran the engine to pump the water for the separators and used steam turbines separators. The amount of water in the boiler, the steam pressure and the fire were left practically the same as at the close as at the beginning of the test. Soft coal slack at $4.00 per ton used for fuel. The cost of elevating the water and running the separators was about 2¼cts. per 1,000 lbs. Taking 3 lbs. of butter as an average yield per 1,000 lbs. of whey the cost per pound of butter for this portion of the work would be ¾ c. We are strongly of the opinion that were an ejector used, instead of a pump, for elevating the whey the cost would exceed this somewhat.

During the session we conducted a number of experiments in the *making of butter from whey.* While it is usually of good quality when first made, it did not prove to be possessed of good keeping qualities. It readily deteriorated in flavor. Of course the milk, and frequently the whey, was old and this may have had much to do with the keeping quality of the butter. However, it suggests the necessity for a thorough investigation of the whole subject, and this we purpose doing during the season of 1908, under regular factory conditions. It would be wisdom on the part of factorymen to await these results.

Another thing we learned during our experiments was, that by increasing the speed of the separator slightly you can separate, and separate efficiently, fully 60 per cent. more of whey than the machine is rated to separate of milk; that is, a machine with a rated capacity of 3,000 lbs., will readily separate 5,000 lbs. of whey. Of course, this call for a cover with a larger inlet tube.

Making Cheese from Rich and Poor Milk: During the session just closed we were afforded a splendid opportunity of investigating this point, as we were able to obtain milks varying in fat content from 3 to 4 per cent. On several occasions we put like quantities of the different grades of milk into different vats and made them up separately. When the cheese were made the yields differed so much that when they were placed side by side they resembled a flight of stairs. Let me give an example, which could be multiplied many times if space afforded:

Lbs. Milk	Per cent. Fat.	Lbs. Cheese.	Fat in Whey (%)
325	3.0	27.0	.2
325	3.4	29.5	.2
325	3.8	35.5	.2

Furthermore, there was a marked difference in quality, the cheese from the richer milk being quite superior to that from the poorer. The lesson is obvious. We should certainly pay in cheese factories according to quality and not by the pooling system.

This work was conducted by our instructor in cheesemaking, Mr. G. G. Publow, and needless to say, was carefully and skilfully done.

A Common and Unsuspected Cause of Cream Testing Low in the Fall when the Milk is Rich: While it is well known that changing the cream screw or the speed or feed, or a difference in the richness of the milk, will alter the richness of the cream, these do not furnish a reason for the cream supplied to our cream-gathering creameries so commonly testing lower during the fall of the year than during the summer, despite the fact that the milk has increased in richness.

Under the direction of our instructor in buttermaking, Mr. Stonehouse, we made an investigation of this subject, with the result that we fully satisfied ourselves that this apparent anomaly is really due to the partial cooling of the milk, during the cool weather of this season of the year, before it is put through the hand separator. The following data will serve to illustrate this point:

Machine.	Temp. of Milk.	Test of Cream.	Test of Sk. Milk.
A	80	27	.10
	95	31	.10
B	80	25	.08
	95	28	.06
C	85	40	.025
	95	43	.025

In all cases we took the same milk and divided it, separating one portion at the lower and one at the higher temperature, as indicated.

The explanation of the foregoing no doubt lies in the fact that as the milk cools it becomes more viscous or syrupy in its consistency and as a result does not flow out the skim-milk tubes so readily, thus causing a larger percentage to be taken as cream.

ANNUAL REPORTS

OF THE

Live Stock Associations

OF THE

PROVINCE OF ONTARIO

1907

Dominion Cattle Breeders' Association
Dominion Sheep Breeders' Association
Dominion Swine Breeders' Association
Ontario Poultry Associations
Provincial Winter Fairs
Ontario Horse Breeders' Association and Exhibition
Ontario Spring Stallion Shows

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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TORONTO:
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1908

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THIRD ANNUAL REPORT

OF THE

POULTRY INSTITUTE

OF THE

PROVINCE OF ONTARIO

1908

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO.

To the Honourable Sir WILLIAM MORTIMER CLARK, K.C., *Lieutenant-Governor of the Province of Ontario.*

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present herewith for the consideration of His Honor the Report of the Poultry Institute for 1908.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1908.

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POULTRY INSTITUTE.

The third annual Poultry Institute of the Province of Ontario was held in the Poultry Department of the Agricultural College, Guelph, on the 10th, 11th and 12th of February, 1908.

INCUBATION.

By W. H. Day, O.A.C., Guelph.

What I have to say to you this afternoon may be to some extent what some of you in the short course have already heard. In the spring of 1906, we began some investigations into the subject of incubation. My knowledge of incubation, or in fact of any phases of the poultry question, were very meagre indeed. I had done a little work on the question of humidity and Prof. Graham asked me to undertake the same line of work in connection with incubation. That is, to see whether humidity had any effect on incubation, either natural or artificial. Our ideas upon the subject were somewhat hazy, as they must be upon any new subject. There is not, so far as I know, any record previous to our work of any investigation on humidity under the hen, or on the effect of humidity on artificial incubation. So I say that our ideas were somewhat hazy upon the subject. We thought we would proceed somewhat regularly, that is, we would put the wet and dry thermometers in the incubator and determine the humidity that existed there, as the incubator was ordinarily run. Then, knowing the performance of the incubator with humidity at that amount, we would vary the humidity by adding water, placing vessels of water in the incubator and producing different degrees of humidity in it. That was not as easy as it appeared on the surface, and before we had gone very far, we were impressed with the idea that we were going the wrong way about this matter, that we should first begin by investigating the conditions under the hen, who is the natural incubator, and knowing the conditions existing there, we would know what conditions we should reproduce in the incubator in order to get the best results. Then with this idea in view, we did not switch off from the question of humidity in the incubator, but continued that work and at the same time determined the humidity under hens sitting in various kinds of nests. This was in the year 1906. We found out in that year that there was much more moisture under the hen than there was in the air in the incubator, and therefore we said, "It is a pretty safe conclusion that we should have more moisture in the incubator; if the hen had it, the incubator should have it. Then at this point Mr. Graham asked us if we could determine carbon dioxide, and Mr. Thom undertook that side of the work and we determined the carbon dioxide under the hen. Now, this determination of carbon dioxide had been made previously by Mr. Dryden, of Utah. What we did in that regard was simply a con-

firmation of Mr. Dryden's results. Mr. Dryden found there was much more carbon dioxide under the hen than there was in the incubator, and we found the same condition.

Then we said it is a fair conclusion if the hen has a good deal of carbon dioxide in the nest when she is hatching, the incubator would hatch better with a larger amount of carbon dioxide than there is in incubators as ordinarily run. At this point we hit upon something unexpected, as we thought, a discovery, namely, that there was greater circulation of air under the hen than in the incubator. These were the outstanding facts of our work in 1906, that there is high humidity under the hens, much higher than in the incubators, high carbon dioxide under the hen, and lastly that there is much higher circulation under the hen than in the incubator and we said these conditions must be re-produced in the incubators to give best results.

Now, those of you who were at the Institute meeting last year will remember that one gentleman attacked very strongly my method of determining humidity under hens. That method consisted in putting the wet- and dry- bulb hygrometer in the hen's nest. The objection was this, that by putting in the wet bulb we were introducing more moisture than was naturally there and therefore we were increasing the humidity, and therefore this was not a reliable method. The gentleman suggested instead a method which we had already tried without success, namely, drawing air from under the hen through substances which would absorb the moisture from it; weighing the substances before and after they absorbed the moisture, and in that way determining the absolute amount of moisture under the hen.

You will see that this is open to the contrary objection; just as soon as we begin to draw air from under the hen fresh air has to go under her to take the place of that withdrawn. This air being dryer reduces the nest humidity slightly. The season of 1907 we were more fortunate with regard to the method which I have just referred to, namely, drawing the nest air through substances which would absorb the moisture. Before undertaking to apply this method to the nest it was necessary that we should be able to make it work in the ordinary atmosphere of the room, and in testing the atmosphere in the room we ran a series of experiments from May to September, seventeen readings altogether, and we found an average humidity of 49.5 for the seventeen readings. Authoritative tables on the subject using the wet and dry bulbs gave an average humidity of 49.3. This established our method of finding humidity absolutely; that is, we could draw air through these tubes and weigh the amount of moisture they absorbed, and from that we could figure out the humidity, so that it would come just the same as by the wet- and dry- bulb hygrometer when they are subjected to free diffusion in the room. Taking the absolute method and applying it to the humidity under the hen, I have found for hens on earth nests a humidity of 70.8. Taking the frame hygrometer and putting it under the same hens I found the humidity to be 71.8, as against 70.8 by the absolute method; therefore, any results that we published from the frame hygrometer are correct within the limit of experimental error; that established that our methods of last year were reliable. Further tests were made upon the subject of carbon dioxide throughout the whole summer of 1907, again showing much more carbon dioxide under hens than in incubators.

By these investigations we confirmed last year's conclusions, that incubators should be run with high humidity and high carbon dioxide, like the

hen. But these conclusions are worth nothing unless they will make good in practice, and the work this year was largely in testing conclusions which we had come to last year, and verified this year. Prof. Graham carried out the practice part of the work and I have tables illustrating his results, and I shall draw your attention to some of them.

Comparison of Methods of Hatching.

Method.	No. of eggs set.	% infertile.	% fully formed, dead in shell.	% hatched of total eggs set.	% hatched of fertile eggs.	CO_2 in 10,000 parts.	% evaporation.	% of chicks dead in 4 weeks.	Live chicks at 4 weeks in % of eggs set.	No. of hatches.
Hens.										
Earth nest	23	13.1	4.3	60.9	70.0	35.6	9.8	14.3	52.2	2
Straw nest	23	8.7	8.7	52.2	58.1	37.14	10.9	16.6	43.5	2
Ventilated nest	23	13.1	13.1	60.8	70.0	24.08	14.6	35.7	39.1	2
Roomy nests	123	10.6	7.3	66.6	74.3	.....	12.2	20.7	52.8	11
Crowded nests	176	15.9	4.0	50.0	56.8	.....	11.8	12.5	43.7	16
All hens	299	13.7	5.4	56.9	71.6	31.93	12.1	16.5	47.5	27
Incubators.										
Buttermilk and Zenoleum	61	8.2	19.7	49.1	53.5	.....	12.2	8.0	45.9	1
Whole Milk and Zenoleum	110	17.3	10.0	58.2	70.1	11.11	9.0	21.8	45.5	2
Moisture (H_2O) CO_2 and Zenoleum	44	13.6	11.3	52.2	65.0	55.16	8.3	13.0	45.4	1
Moisture (H_2O) and Zenoleum	464	16.2	11.4	52.8	63.6	8.29	10.2	16.7	44.0	6
Buttermilk	583	18.3	10.0	52.0	63.9	12.03	10.0	28.0	37.4	8
Moisture (H_2O) and CO_2	129	20.1	7.8	48.1	59.9	55.0	9.8	22.5	37.2	2
Moisture (H_2O only)	1,221	13.9	11.3	51.9	62.7	10.46	12.1	37.0	32.7	13
Fumes, dry	112	24.1	14.3	38.4	52.5	58.21	13.3	16.3	32.1	2
Zenoleum, dry	327	13.1	13.7	47.4	59.0	5.86	15.2	32.2	32.1	3
Skim Milk	330	13.6	13.0	40.6	49.6	.....	11.9	26.1	30.0	3
Water, Milk and Zenoleum	83	12.0	14.5	32.5	37.0	7.78	12.6	15.3	27.5	1
Fumes, Moisture and Zenoleum	61	21.3	14.7	34.4	43.7	.....	9.4	23.5	26.2	1
Whole Milk	353	15.3	12.2	48.7	56.9	12.12	10.8	52.3	23.2	4
Dry (no treatment)	1,406	16.3	12.6	40.7	52.1	9.15	15.1	60.5	16.1	12

Comparison of Methods of Hatching.

You will observe that this chart gives a comparison of various methods of hatching. The first column gives the number of eggs set; the second column gives the percentage of infertile eggs; the third column, the percentage of fully formed dead in the shell; fourth column, the percentage hatched of total eggs set; fifth column, percentage hatched of fertile eggs; sixth column, the number of parts of carbon dioxide in 10,000 parts of air; seventh column, the percentage of evaporation from the eggs; the eighth column, the percentage of chicks dead in four weeks; the ninth column, the number of live chicks out of every 100 eggs set; and the last column, the number of hatches.

Beginning at the very bottom, we find the dry incubator, that is the incubator into which no moisture was introduced, with the poorest results of all, only sixteen chickens out of every 100 eggs set, over 1,400 eggs being hatched in these dry machines. To observe the effect of moisture, note the eighth line from the bottom where moisture was provided by water only. Over 1,200 eggs were hatched by this method, and they gave us 33 chickens for every 100 eggs set. Comparing the results in each column, you will find these moist machines ahead of the dry ones in every particular, that is, there were less infertile eggs, less fully formed dead in the shell, greater percentage hatched of the total eggs set and also of the fertile eggs, more carbon dioxide in the machine, less evaporation and a much less death rate. These great differences in result between these two methods of hatching cannot be due to the difference in the eggs set, because in each test the eggs in the moist machines were from the same hens as those in the dry machines. Every hen was trap-nested, and from each one to-day's egg would be put in a dry machine, to-morrow's in a moist machine, the next day's in a dry machine, the following day's in a moist machine, and so on with all the eggs laid be each hen. Hence there could be no difference between the eggs hatched by the two methods; hence we must attribute the improvement in results to the moisture alone; that is, by simply making the air in an incubator very damp we were able to get more than twice as many chickens four weeks old out of every 100 eggs set as in the dry machines.

To ascertain if carbon dioxide (CO_2) was beneficial some of this gas was introduced into the egg chamber of one of the moist machines, enough to raise the carbon dioxide contained in the incubator to about twice the amount under the hen. This treatment gave us 37 chickens for every 100 eggs set. It will be observed this method gave more infertile eggs and a smaller hatch than where moisture only was used, but to counterbalance these losses there were fewer dead in the shell and the death rate was very much lower, giving a net result of four chickens more per 100 eggs set than moisture only. Now, it is known that certain bacteria give off carbon dioxide in their life process, hence the idea was suggested to inoculate buttermilk with some of these bacteria and put the milk in the trays of some of the machines. The net result of these machines was 37 chickens for every 100 eggs, just about the same as when pure carbon dioxide was introduced into moist machines. Buttermilk alone, without inoculation, was also tried and it gave the same result, 37 chickens out of every 100 eggs set. At this stage of the work Prof. Graham happened to disinfect some of the machines with zenoleum, and it was observed that the results were greatly improved. From that point on disinfection by zenoleum was systematically tested, and it was found that almost invariably the zenoleum had the effect of increasing the results very much. By its use in conjunction with moisture of one kind or another we were able to get from 44 to 46 chickens out of every 100 eggs set. This was a long step in advance. The mere use of this disinfectant increased our results by 7 to 9 chickens four weeks old on every 100 eggs set.

It seems strange to think of methods of hatching influencing the fertility of the eggs, but I think it may be explained as follows:—There is a germ of life in a certain percentage of these eggs, in some it is weak and in others it is strong, and when we give perfect conditions even the weakest germs will start, but when we give imperfect conditions, the weak germs die before the start and some eggs that were really fertile are not recognized as such, hence the apparent variation in fertility. Dryden, in Utah, also found that moisture affected the apparent fertility.

Lamp fumes were applied to one machine in this way. We set two machines, side by side, and from the lamp of one we led a tube right into the egg chamber of the other so that all the fumes that were formed from the first machine were passed into the egg chamber of the second machine, and we got a great deal of carbon dioxide in that way; the infertility was high and the hatch low, but the death rate was also low, as only 16.3 per cent. of the chickens died. Despite the fumes, we had 32 chickens out of 100 eggs set, as compared with 16 in the dry machine, so that the dryness seems to be the greatest enemy we have to contend with in artificial incubation. Every one of these machines that were run dry gave white diarrhœa in the chickens hatched, and the fumes gave white diarrhœa in none. Of the machines run with moisture only 50 per cent. gave white diarrhœa, while the disease was entirely absent where zenoleum was used in conjunction with moisture.

The zenoleum gave more and better chickens, ones that could not be distinguished from hen-hatched chicks. In almost every case where zenoleum was used compared with machines run in any other way, with the zenoleum the machine had less carbon dioxide than the other.

The top part of the chart gives us the performance of the hens and you will notice that they had very few fully formed die in the shell. Earth nests gave us 52 chickens alive at the age of four weeks and the best artificial method we have yet been able to use gave us 45 or 46 in parallel tests. You must not conclude that these figures would apply absolutely to other locations. In the country a man would probably get higher hatches from the hen and from the incubator. But, if moisture, carbon dioxide and zenoleum will give us better results they will probably do so for others.

This year we have substantiated our conclusions of last year with regard to circulation, as will be seen from the following table:—

Incubator.	Method of treatment.	Humidity as determined by absolute method in August.	Per cent. of evaporation.	Number of hatches of which the evaporation is the average.
Hen.....	Earth nests.....	70.8	9.7	3 hatches, May, June and July.
Hen.....	Straw nests.....	52.8	11.9	20 hatches, May, June and July.
Hen.....	Ventilated nests..	35.00	14.5	2 hatches, June and July.
Model Incubator	Buttermilk	54.4	9.5	2 hatches, large trays of buttermilk, almost covering the bottom.
No. 1, 1907, Prairie State No. 3 " " No. 4 " "	Sand, tray and water.....	46.2	9.6	10 hatches.
No. 2 " "	Dry.....	21.3	14.5	7 hatches.

Hens on earth nests have a humidity of 70.8 per cent. These three Prairie State incubators had a humidity of 46.2. 70.8 is just about once and a half greater than 46.2; that is, the humidity in the nests was 50 per cent. higher than in the Prairie State incubator.

What are the factors that influence evaporation? First humidity of the air. With high humidity the evaporation will be slow, and *vice versa;* you know also that evaporation is faster on a windy day than on a calm day; temperature and atmospheric pressure also influence evaporation; but these are the same in the nests as in the incubators, so the two things that cause the difference of evaporation from the eggs are humidity and air circulation. Here is a hen and the humidity in her nest is 50 per cent. greater than the humidity in the Prairie State incubator, and yet the evaporation from her eggs is a little the lower. To me that can mean only one thing, namely, that there must be circulation going on in the hen's nest more than there is in the Prairie State incubator. I do not know just how much we have to increase that circulation, because that is the most difficult point we have to deal with, and one which is yet undetermined. Last year we told you moisture should be given to the machines and we tell you now that by using plenty of moisture we have been able to produce double the number of livable chicks produced by dry machines in parallel tests. We tell you to-day circulation should be applied to the machine, next year we hope to tell you how much.

Mr. NIX: In natural incubation the egg is more or less covered with a film of oil. Would that check evaporation and would the elimination of gas from strong germs be greater?

Mr. DAY: The elimination of gas I think would be greater. We have considered all the loss from the egg as due to evaporation. Now that is not quite true, because there is the formation of carbon dioxide by the germ which amounts to about one-tenth. There would, I think, be more loss from the active germs than from the weak germs. If there is oil on the surface of the egg, I should think it would hinder evaporation.

Mr. NIX: That would be proof still more for circulation?

Mr. DAY: I think so. There is one other point I would like to mention for your special information, that is with regard to vapor pressure. Through a great deal of arithmetic and algebra, we were able to figure out what the vapor pressure was in these various machines. In the Prairie State, run dry, the pressure of the vapor is just the same as it was in the room, although there is such a great difference in temperature.

PROF. GRAHAM: What do you mean by vapor pressure?

Mr. NIX: The old theory that you have the same humidity in the incubator that you have outside, won't hold true.

Mr. DAY: It is the most fallacious thing you could have said. The natural pressure of gas will tend to distribute it equally through all space. If I turn out a little beaker of water here, there is a lot of vapor will come up from the water, and that vapor has a pressure like the air and consequently tends to distribute itself through the room equally. The old idea was that when you lit the lamp and closed the machine up, and the temperature in the machine rose, and since it is a well-known fact that the warmer the air is, the more water-vapor it will hold; therefore, as this air in the incubator warmed up, it was capable of holding more air, and consequently it would take more from the atmosphere, through the cracks or the ventilator in the incubator. It is a question of vapor pressure. The moisture will travel which ever way the vapor pressure is least. If the pressure is least outside, the moisture will travel from the incubator to the outside; if the pressure is least inside, the moisture will travel from the air inside. What is the case in this dry machine? Test after test for a month, the vapor pressure in the room deduced from the wet- and dry- bulb readings, .444 inches of mercury, the vapor pressure in the incubator was .433.

Mr. Nix: What was the relative humidity in the room at the same time?

A.—61.3; the relative humidity in the incubator 21.3; although we had a humidity of 61 per cent. in the room we had a vapor pressure of .444 and in the incubator with a humidity of only 21.3. We had a pressure of .433, so that in the case of your dry incubator the humidity is not increased by acquisition of vapor from outside air.

Mr. Nix: Just simply air which expands.

Mr. Day: That is all. The pressure in the moisture machine is more than twice as much as it is in the dry machine.

A Member: Is carbon dioxide that comes from the fumes of the lamp the same as comes from the hen.

Prof. Harcourt: There can only be one kind of pure carbon dioxide, it is all the same.

A Member: Would there be any poisons from the lamp?

Prof Harcourt: There may be some poisonous gases associated with it, that have not been worked out.

Q.—How do you use zenoleum?

A.—Wash the inside of the machine with 10 per cent. solution of zenoleum: it should be thoroughly washed.

Q.—How would a spray pump do?

A.—It will not work. After you get the machine hot, take a 10 per cent. solution and soak the machine, and put your egg right in while it is steaming. I am not sure but that the results come from the fumes.

Q.—Other kinds of disinfections would work the same?

A.—We have heard of two that would have the same result, Jay's Fluid and Creoline.

THE CHEMISTRY OF AN EGG AND CHICK.

By Prof. Harcourt, O.A.C., Guelph.

The work we did on the egg question last summer was particularly with reference to the quantity of lime that would be absorbed during the hatching period. It is well known that carbon dioxide will dissolve lime, and when it was first found that there was carbon dioxide in the air under the hen during the hatching process, it was thought possibly this carbon dioxide had something to do with the amount of lime in the chick and also in the vitality of the hatch. We thought we would look into the question first from the side of the composition of the egg to see what amount of lime and the phosphoric acid there was in the egg and then we might study the other side of it to see what amount of lime and phosphoric acid there was in the young chick at the time of hatching. Consequently, we first analyzed a great number of eggs to see how much of these constituents there was in the yolk, in the white, and in the shell of the egg. Of course it is evident that we could not analyze the egg and get a chick from it as well, so we had to analyze a large number of eggs and base our conclusions on average results. We found that there was a considerable variation in the weight of the eggs from different hens, and also in the weight of eggs from the same hen; frequently a great difference in the amount of lime in the shell, in the yolk, and in the white of the egg. The following table shows the average weight of the eggs and the average weight of the phosphoric acid and lime in the shell and contents:

AVERAGE WEIGHT OF EGGS AND THE PHOSPHORIC ACID AND LIME IN SHELL AND CONTENTS.

Egg No.	No. of Analysis	Average weight of egg.	Average weight of			Average P_2O_5 in		Average CaO in	
			Shell.	White.	Yolk.	Shell.	Contents.	Shell.	Contents.
		Gms.	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.	Gms.
17	5	63.83	8.64	35.75	19.44	.0248	.1353	3.431	.0436
360	4	50.85	6.58	26.57	17.09	.0205	.1052	2.622	.0378
40	6	54.32	6.91	28.75	18.65	.0157	.1205	2.891	.0337
356	2	44.27	5.34	22.98	15.94	.0174	.1114	2.032	.0285
249	4	49.70	6.35	30.89	14.13	.0222	.1164	2.483	.0312
805	6	49.89	6.65	27.44	15.59	.0223	.1149	2.594	.0349
696	3	53.29	6.40	28.79	18.09	.0229	.1270	2.691	.0431
517	5	65.28	7.65	40.74	17.49	.0196	.1187	2.908	.0364

It will be noticed that there is quite a variation in the weight of the eggs from different hens, 44.27 to 65.28 grams. At the same time, it is evident that the heaviest egg did not have the heaviest shell. The variation in the weight of phosphoric acid and lime in the white and yolk of the eggs from different hens was not so wide as between different eggs from the same hen. Egg No. 360 was rather a small egg, but usually gave good strong chicks. Egg No. 40, a larger egg, and a comparatively poor hatcher contained slightly more phosphoric acid and less lime than No. 360.

Mr. DAY: Practically speaking, there is very little lime in the white and yolk of the egg.

A.—Yes, a very small amount. A good hatching egg contained .0378 grams of lime, and a poor hatching egg .0337. It would hardly seem possible that so small a difference in the lime content would have anything to do with the vitality of the hatch.

Q.—How about phosphoric acid in the hatching?

A.—I can only refer to the results in the table, which show that egg No. 360, a good hatching egg, contained less phosphoric acid than egg No. 40, a poor hatcher. However, I would not want it to be inferred that we contend that the larger amount of phosphoric acid decreased the vitality of the chick. We simply have no conclusive data on the point.

Q.—Was the shell of egg No. 40 more open and porous than that of egg No. 360?

A.—No notes were made on this point. After having gathered some data regarding the average weight of lime in eggs, we next determined the weight of lime in the young chick. This we found varied from .11 to .21 grams per chick. Some notes regarding the apparent strength of the chicks were made at the time they were taken from the shell, and it was afterwards found that whenever the chick had been marked as weak, the lime content was low.

The following table gives the weight of lime in the young chick by different methods of incubation, the per cent. of hatch, and the vitality of the chick as shown by the percentage number alive at the end of four weeks. In making up the average weight of lime in the chick, all amounts below .1600 grams were discarded, because all chicks containing less than that amount were abnormally weak.

AVERAGE WEIGHT OF LIME IN CHICKS WITH DIFFERENT METHODS OF INCUBATION.

Method of Incubation.	Lime (CaO) content of chick grams.	Carbon dioxide (CO_2) in 10,000 parts grams.	Per cent. of hatch of fertile eggs.	Per cent. of chicks alive at end of four weeks cal. to fertile eggs.
June Hatch.				
Cyphers	.1796	8.22	46.1	23.05
Peerless, dry washed with zenoleum	.1786	9.16	60.2	52.85
Continuous Hatcher, a little moisture	.1736	10.70	58.0	53.0
Hen	.1966*			
July Hatch.				
Model, buttermilk	.2047	10.0	65.3	53.09
Prairie State, lamp fumes, dry	.2056	58.21	43.5	36.5
Prairie State, dry	.1930	8.73	49.8	30.07
Prairie State, artificial CO_2 and H_2O used as moisture	.1988	51.42	57.08	49.1
Prairie State, zenoleum and moisture	.2076	7.26	62.0	54.0
Hen	.2106*			
Average of hens set during whole season		31.93	66.0	55.1

* All eggs used for analysis.

It is at once apparent that the lime content of the chicks of the July hatch was higher than that of the June hatch. Prof. Graham says that the chickens were much more thrifty. In the July hatch, with one exception, the vitality, as shown by the figures in the last column, correspond with the quantity of lime. The exception is in the case of the incubator in which dry lamp fumes were used, and this is caused by the low percentage hatch. The chicks that were got were strong and thrifty.

Q.—Would there be any difference in the amount of lime fed to the chickens?

PROF. GRAHAM: They were all fed alike.

Q.—Would the chick get any lime from the shell?

PROF. HARCOURT: Yes; it must have. Water got from the soil is hard because of the lime that is in it, dissolved by carbon dioxide, which is a gas given off from our own lungs, or obtained by the decomposition of any organic matter. Experiments have demonstrated that there is carbon dioxide under the hen while she is setting on eggs and that carbon dioxide is given off from the egg during incubation. But carbon dioxide coming from the egg will not dissolve the calcium carbonate of the shell unless it is in the presence of moisture. It seems to me that it is very probable that the carbon dioxide formed by the chemical change that takes place during incubation works on the inside of the shell in the moist condition and dissolves the lime so that it may be absorbed by the chick.

Q.—Does not the old hen get that increase of lime by the action at the outside of the shell?

A.—I have very serious doubts about that. I think the carbon dioxide acts on the inside of the shell.

Mr. DAY: Then it would be simply a matter of carbon dioxide gas?

A.—Has it been proved that the addition of carbon dioxide to the incubator improves the vitality of the chick?

Mr. DAY: Yes.

PROF. HARCOURT: Then it must be that the presence of the carbon dioxide prevents rapid diffusion from the inside of the shell. I cannot see how carbon dioxide acting on the outside would help a chicken.

MR. DAY: Zenoleum in every case diminishes the result in carbon dioxide, but increases the result in the chicken. Zenoleum in a dry machine gave us 5.86 carbon dioxide, and an untreated dry machine gave 7.78, and the same thing is true in the case of moisture only. Zenoleum seemed to reduce the amount of carbon dioxide, although it gave stronger chicks and more lime.

PROF. HARCOURT: Zenoleum is a disinfectant, and it is a very penetrating substance and it is possible that it penetrates within the egg, and holds in check certain changes during incubation.

PROF. GRAHAM: I can prove it penetrates the egg.

A MEMBER: Don't these tables show that lime is not necessary to the vitality of the chick?

PROF. HARCOURT: If I had the total figures here I could show to you that in many cases where the chicks were marked as weak, the lime was very low. We found that up to the eleventh day of incubation the lime in the chick was practically the same as the lime in the egg, but we did not follow it after that. It seems though the absorption takes place in the last half of incubation.

MR. DAY: The method of incubation seems to be in direct relation to the amount of lime absorbed.

MR. NIX: I have been told by bacteriologists that we find one egg in twenty that is sterile. It is the growing embryo having to sacrifice a certain amount of vitality to kill the germs of infection.

PROF. HARCOURT: Possibly, and perhaps the zenoleum cuts out the action of these germs. There is no doubt zenoleum is a disinfectant and as it penetrates into the egg, it is quite possible that it holds in check something something that produces carbon dioxide and possibly some undesired changes.

Q.—Will feeding lime to the hen have any effect on the egg?

PROF. GRAHAM: We feed our hens all the lime they can eat.

Q.—Would plaster from old buildings be good to feed to hens?

A.—Yes, give them all they will eat.

Q.—How would you supply the moisture?

A.—We have a moisture pan about the same size as the bottom of the incubator.

Q.—Do you put water in, cold or warm?

A.—Warm, 90 degrees.

Q.—What depth of water do you put?

A.—About one inch. In order to put in zenoleum we heat the machine up, and then take one-tenth of solution of zenoleum and scrub the machine. We use about two quarts of zenoleum, and simply soak the side and top of the machine and the dry thermometer and the thermostat and everything else, and then put the eggs on the tray and slide it in. I think you can smell the zenoleum on the unfertile eggs two weeks after they come out of the incubator.

There is a bulletin issued by the Department which gives the result for incubators and the method for operation.

THE USE AND ABUSES OF BROODERS.

By J. L. Nix, Homer City, Pa.

Of what does it profit a man if he hatch all his eggs and then lose all his chicks?

I come before you handicapped as an Institute talker because of my being identified with incubator and brooder manufacture. Anyone who is selling goods is very apt to be partisan and narrow-minded in regard to the efforts of others in the same line. If you will forget that I have a mercenary interest in poultry appliances, on my part I will try and give you as disinterested a discussion upon brooders and how to raise chicks artificially as I can. At a great Institute like this our object is for each one to give their view point from experience and observation so that even seven blind men may know how an elephant looks—to broaden our knowledge from the experience of others and take home with us some new things that will help us to raise more and better poultry.

Artificial production of poultry is comparatively a new subject, and most of the questions under discussion are controversial. Settled facts are few and far between. The most experienced poultrymen are changing their methods continually, and no one has a corner on the best methods. Enough is known in a general way to make the artificial process practical and profitable. At the present time the brooder comes nearer meeting the conditions than the incubator. A good brooder intelligently handled, if given hen-hatched chicks, will raise more and better chicks than the hen herself. The brooder even with incubator chicks will do better than the hen with the same kind of chicks.

The great drawback in the artificial process has been the high death loss the first few weeks. We have been blaming the feed, and consequently the market is flooded with "Chick Feeds" of all kinds, from three to ten cents a pound. Chicks were dying apparently from indigestion, and tons of literature have been devoted to the proper methods of feeding young chicks. We blamed the brooders for chilling them, for overheating or smothering them. The reasons given were as various as we now hear as to the causes that produce White Diarrhoea. The most prolific cause of brooder mortality in the light of recent investigation would lead us to believe that it is defective incubation. Incubators have not yet been made that will equal a hen in efficiency. In the Guelph vitality tests the best results secured in incubators were from 10 to 15 per cent. below the hen in producing livable chicks. In a recent letter from Prof. Edward Brown, of University College, Reading, Theale, (the greatest authority in England), states: "Your comparisons between hatching under hens and in incubators quite confirm our own experience. We have never been able to get the same average in the machines, although the difference was not quite 10 per cent. Still it was there." Proof can be secured in plenty that there is still room for improvement in incubators. While the percentage of chicks hatched in the incubators has been satisfactory, they have been of much lower vitality than if the same eggs had been hatched under hens. Incubator chicks if dry-hatched were short weight—all have been predisposed to white diarrhoea, defective in mentality. A hen hatched chick of two days of age has the protective instinct as well developed as an incubator chick of ten days of age. The incubator chick is deficient in ash, and no doubt a biological examination would show more or less defective structure all through the chick. So true is the fact there is something wrong with the incubator process, that a very

large majority of the large poultry plants go out of business in three or four years, because they cannot raise enough birds to make a profit, or even keep up the breeding stock.

Last season I travelled a good many hundred miles visiting poultry farms, large and small. Every place I visited had white diarrhoea except two, with mortality of from 15 to 90 per cent. The two exceptions, Mr. Robertson, at St. Catharines, and Mr. Mat Gardner, at Auburn, N.Y., had no white diarrhoea and little mortality, which can only be explained from the fact their hatching was all done with hens. So when your chicks die in the brooder it is not always the brooder's fault. Do not expect the impossible. A poorly hatched chick cannot be raised even with a hen, while faulty incubation is causing high mortality in young chicks; in fact, any cause that will impair the vitality of the breeding stock, impairs the vitality of the resultant chick. The principal influences are soil or range, housing, feeding and care.

Recent comparative vitality tests with properly constructed brooders, however, indicate that they have a higher rearing power than the hen—an unlooked for condition truly. The generally accepted opinion that most of of our troubles have been with the brooder is erroneous. The construction of a brooder is much more simple than an incubator. All that is required in a brooder is the application of the proper degree of the heat and forced ventilation without draughts. Authorities may dispute over the manner or method of making these applications. All things considered, I have secured the best results with all top radiant heat and forced down draft ventilation of moderately heated air, circular high hover giving plenty of air space and all round curtain, so the chicks can get out on all sides. It is the nearest approach to natural brooding. The chicks, or many of them, lay with their bodies under the hover and their heads outside, breathing the cold, outside air.

Soil: The richer the soil the more economically birds can be grown. The natural food picked up is greater, more animal life and the green food is more succulent and nourishing. Too often we see large poultry farms, with thousands of dollars expended in equipment, located upon poor or sandy soil, so thin and light that a grasshopper would die of starvation from lack of anything green to eat. All green food has to be supplied summer and winter, at greatly increased cost of labor. The only thing that can be said of the sandy farm is that it is sanitary; birds can be crowded in small pens and the droppings wash down into the earth after every rain. The better way to avoid soil contamination, sickness of both young and old is to use the colony system on the crop rotation plan, so ably advocated by "Jerry." The best land for poultry would be the land that is best for live-stock, horses, or cattle.

Colony System: Use the colony system after the snow goes off the ground both for brooder and young stock. Unless the houses are portable the advantages of the system are largely lost. Houses may be 6 x 6, 6 x 8, 8 x 12, or 8 x 16; anything large than this is very difficult to move. Use the open front style with all windows and screens hinged at the top and open outwards. In the summer time face the north. The ends of the houses should face the prevailing winds, both for the comfort of the fowls and the help it gives in handling brooder lamps in windy weather.

The continuous or winter laying house is very desirable in a cold climate. In winter time range is so reduced on account of snow that the value of the colony house is lost. The long laying house reduces the labor and care—

the most important factor in poultry production. As soon as the snow goes off in the spring it is better to move the laying hens to the colony houses on the open range.

For early chicks, broilers, soft roasters, etc., chicks can only be produced out of season by the use of brooders. We have the choice of individual lamp brooders, hot water pipe systems, of many kinds, over-head heat, bottom heat or side heat, enclosed hover systems or the top heat open pipe systems, the individual lamp brooder in connection with the hot-water pipes to take the chill off the house and warm the runs in cold weather. Each plan has its advantages and each system many shortcomings.

The individual lamp brooder has the advantage of uniform temperature best suited to the needs or age of the brood, and good ventilation: the disadvantage of not heating the runs, the trouble, care and danger of so many lamps to look after.

The enclosed or hover pipe systems have the advantage on the saving of labor, only one fire, no danger, ease of maintaining temperature in any kind of weather, warm runs, but trouble with the ventilation. The ventilation is difficult to control and requires great care and experience to handle them successfully. The only ventilated hover where hot water pipes are used is the bottom heat system. The introduction of the bottom heat does more injury than the benefits attained by the forced ventilation, and this system is used but little by practical poultrymen.

The open pipe system seeks by not using the hover to heat the brood house so the chicks are comfortable any place in the run, pure air is assured, and crowding of the chicks is avoided. This would at first glance seem to fulfil the conditions, but this system has not met with general success. The brood house is too warm, the chicks breathe too much hot air, become soft and weak. The change to out of doors is too great. Winter chicks must be accustomed to cold air as soon as possible.

Construction of Brooder House. The best plan for winter chicks is the single house from 12 to 16 feet wide, facing the south—alley in north, all glass in south, never in the roof. Cement floor is good protection against rats but if used must be covered with several inches of sand and cut straw. The bare cement is too cold in winter for young chicks.

Colony Houses for Lamp Brooders. Almost any kind, size or style of colony houses are adapted to the use of portable lamp brooders. They should be of the open front style, arranged with swing glass and cloth screens, open outward so the house may be open or closed at will, depending upon the weather. In a 6x6 house, two hovers may be placed: in a 8x10, 3; and in a 8x16, four hovers may be placed. The object of placing two or more hovers in a house is to take the chill off the house, and work can be commenced earlier in the spring. The colony house is not recommended for winter work. Use a winter brood house. The colony house shoud be upon runners, or if made on the Engilsh plan on wheels so as to be moved easily from place to place either to get fresh foraging ground or fresh soil for a new brood of chicks. For spring and summer rearing with a good, portable hover the portable colony house provides the best known method of raising chicks successfully. When the birds are old enough, roosts are provided, and the hovers transferred to another house and another brood started. The first brood is left in the house until removed to winter quarters in the fall.

The out door brooder comes next to the colony house as a practical device for spring and summer rearing. The greatest defect in all outdoor brooders is the lack of air and floor space. The largest of them are too small

and the small ones don't consider seriously. It is not practical to use outdoor brooders to any extent until the snow goes off the ground in the spring, unless placed in a sheltered location.

Range. In selecting the best place for a colony house or outdoor brooder it is preferable where no old fowls range, fresh soil if possible. A cultivated field or garden in preference to a grass range.

Temperature of the Brooder. The best place to harden off chicks is in a good self-regulating brooder. Chicks should be removed from the incubator at the earliest possible moment. The usual hardening off process in an incubator does more harm than good.

Have the brooder littered and warmed up before removing chicks from the incubator. The chicks should be transferred to the brooder in warm covered baskets to avoid chilling them, and, not over fifty or sixty put under each hover.

Heat the brooders from 85 to 110 degrees, depending upon the make of the brooder and position of the thermometer in the hover.

You must first determine the proper temperature from the appearance of the chicks themselves. Just watch them when they settle down for the night. If they are lying down all spread out like sheep on a hillside, happy and contented, with their heads peeping out from under the hover and resting on the floor, rest assured the heat is all right; but, if they are huddled together in a pile, they are cold and need more heat. If they stand up with their mouths open, they are too hot. It is better to have a little too much heat than not enough, as the chicks will work away from the heat if they have a chance. During the night the temperature usually falls and then if there is a little surplus they are comfortable in the morning. While a regulator is not essential on a brooder, it is of great assistance during the first few days. The heat does not need to be watched so closely, and, consequently, the regulator is a time saver. It also provides the proper temperature in the early morning. When there is not enough heat under the hover the chicks pile up, and the weaker ones are trampled or forced to the outside and chilled. If the hover is not warm enough the chicks will not go under it and will pile up in some convenient corner outside. When brooders are not of the two or three compartment style the chicks should be confined within a foot or so of the hover the first few days until they become used to it, and the run gradually enlarged as they grow older.

Ventilation must be freely provided with outdoor brooders. In the colony house type the glass sash is left open at all temperatures above 50 degrees outside, thus assuring an abundance of fresh air. A great many brooders on the market are deficient in ventilation, and it can only be provided by raising the roof an inch or two and fastening permanently in that position.

Litter. At the start we advise against the use of bedding materials that are indigestible or that may be eaten, for in the case of incubator hatched chicks, especially if dry hatched, the natural selective food instinct does not develop until the chick is from six to ten days old. This does not apply to the hen hatched chick. They know grits from grain at the start, but the incubator chick does not. This fact makes an incubator chick more difficult to feed and bed for it is apt to eat anything it can swallow, and too often it succeeds, for many a flock has been kiled by filling up on bran, saw-dust or sand. For this reason do not use bran, saw-dust, coarse sand, or fine shavings. The first choice would be cut clover, next, cut straw, barn litter or chaff, sweet and free from mould and decayed particles. After the first week almost anything can be used. One of the best materials available is dry

earth, especially in warm weather. It absorbs the droppings and is a good disinfectant. Bedding should always cover the brooder floor at least an inch deep and be short enough so that the chicks can scratch in it. Dry chick feeds should always be fed in the litter and every inducement given the chicks to exercise. In some brooders one trouble encountered with earth or dusty bedding is the continual scratching raises a fine dust that closes the gauze of the lamp, causing it to smoke and catch fire.

Feeding. The best chick feed is composed of equal parts of cracked wheat, corn and steel cut oats. Anything else added is a detriment. The advertised feeds with fifty-seven varieties of grains you had better leave alone. Millet, mustard, turnip seed, etc., are very injurious. You will always find when these strange seeds are used on dissecting the dead chicks the gizzards will be filled with undigested seeds, while the corn, wheat and oats have been absorbed. Fresh, wholesome grain, meat, and green food is all that is required to rear young chicks. Fresh butchers' meat cut fine or milk, sweet or sour, is best. Beef scrap is uncertain. So much of it contains tankage. Good beef scrap is all right, but should not be hopper fed until chicks are ten days old. Feed by hand, not to exceed 10 per cent. of the feed. The green food is lettuce or chick weed; as a substitute, sprouted grains, the sprouts three or four inches long. Green grass is a delusion; it is too tough and woody. Lawn clippings will kill little chicks.

Grits. The free use of sharp, flinty grits is to be condemned. It is unnatural. In the newly hatched chick the tissues are soft and the sharp edges of the commercial grits do them no good. Use a small portion. 1 to 2 per cent. of fine oyster shells and the chicks will do better. They need lime worse than they need teeth. Small smooth pebbles are to be preferred if shell is not available. Crushed egg shells are the best grits of all for young chicks.

Starting Weak Chicks. When chicks are improperly hatched and are weak, in place of starting them upon grain foods they can be fed to better advantage upon dry bread crumbs moistened with milk, so as to be in a crumbly condition. After three or four days well-cooked corn bread or pone can be added to the diet. After the first week, regular grain diet can be used.

Mentality of Chicks. Nature provides the young of all wild and domestic animals instincts to protect them from harm. The natural instincts are almost as well developed in the young of wild animals as after they have had several years experience. The hen hatched chicks has the power to select articles of diet which are the best for it, while the incubator chick—especially if dry hatched and from stock that is not in the best of condition, which often happens as breeding stock is seldom in the pink of condition from the improper conditions which are used in handling them—are more prone to disease, and the protective instincts do not develop until they are from six to ten days of age, and a great many difficulties that are encountered in the artificial rearing are from lack of knowledge of this fact. For this reason incubator chicks have to be more carefully fed the first few weeks than chicks which were hatched and reared by hens. Due care should be taken not to feed them too much or have injurious substances around them that would injure them in case they should be eaten.

A great many people are engaged in raising poultry and would like to raise poultry artificially who do not have the means to buy the best of apparatus. It is entirely practical for those who have a little mechanical skill to construct a very satisfactory home-made brooder but they require more skill in management and operation than if a first class commercial article is bought. The manufactured brooder is the result of a great deal of experience, a case of

the survival of the fittest and has a wide range of adaptability as to weather conditions. More people can succeed with them, and, as a rule, they will give better results than the home-made brooder. Almost any kind of a cheap building can be used as a brood house. There should be sufficient glass to provide light and arrangements made for ventilation. In the winter time those who raise early chicks and do not wish to go to the exepense of hot water heater or pipe systems can use an ordinary stove, with lamp brooders, quite successfully. The stove warms the building and runs during the day and the lamp brooders take care of the chicks throughout the night. By very inexpensive and simple methods it is possible to raise a large number of chicks successfully.

Before a new batch of chicks is placed in a brooder, whether indoor or outdoor the brooder should be thoroughly cleaned and disinfected, should be scrubbed with hot water and soap, to which some disinfectant, such as zenoleum, creoline, etc., has been added. In summer time when lice and red mites become plentiful, a brooder con be quickly disinfected and the animal life killed by burning a sulphur candle in the brooder. These are sold by all poultry supply dealers and are a quick and inexpensive way of disinfecting a brooder.

Selecting a Brooder. The point to be borne in mind in selecting a good practical brooder is to get one with large floor area, plenty of air space with abundant means of ventilation. In warm weather it is almost impossible to secure too much air for chicks. Hovers should be preferably round and high. In the summer time the felt curtains are tucked up so that the chicks can receive a gentle heat from above and yet get an unlimitted supply of fresh air. In selecting an outdoor brooder, the brooder built on the colony house plan is vastly superior to other types on account of the protection against storm and by use of the transom window and sash they can be easily ventilated in summer time or upon warm afternoons. The low flat brooder with no provision for ventilation but the holes bored in the sides, or those brooders with small floor area will prove a disappointment, and give very poor results the season through; but the modern improved brooder you will find more satisfactory than the hen, as it will raise a higher percentage, and they will grow faster and will be better developed than those birds that are raised in the natural manner, provided the brooder is intelligently handled and operated.

LESSONS OF THE YEAR.

By Prof. James E. Rice, Cornell University, Ithaca, N.Y.

Let us look if we can trace the evolution of poultry husbandry in recent years to see whether we ought to take a pessimistic or optimistic view of the situation. It seems to me we are entitled to claim that there is such a thing as a new poultry husbandry. Not that we have in recent years discovered some great improvement, or that we have been bringing about a revolution in methods, but looking back over a period of 10 or 15 years it seems to me that we can agree that there has been a quiet, gradual change in methods, that places the poultry husbandry to-day in an entirely different light to what it occupied ten or fifteen years ago. However, I believe we have a new poultry husbandry that differs from the old, principally in its method. Nearly all of this change has come through an effort to accomplish one purpose, and that purpose has been to increase the one man efficiency in the poultry business.

In almost every modern improvement we see that we have been working towards the end of enabling one man to raise more chickens, to feed more hens, and to make more dollars than he ever did before. All these changes have come through four principal methods. First, in regard to the evolution of the method of housing our poultry; second, in regard to our method of feeding; third, in regard to our method of heating, and, fourth, in regard to our method of breeding and rearing chickens. We will first discuss for a few minutes the new poultry husbandry in the light of what we have been able to learn about our methods of handling the fowls and the building of the house. In the first place our houses are costing us a great deal less than it was thought necessary a few years ago. Those of us who have visited poultry farms can vouch for this statement. Poultry houses built from five to fifteen years ago, cost in many cases, from $5 to $7 or $8 for every hen. The house built in these days does not cost more than from $1.50 to $2 per hen in the face of the higher price of material and of labor, and this cost per hen capacity has been brought about in a number of different ways. One of them is that we are building bigger houses than we used to build. You can find lots of poultry houses 8, 10 and 12 feet wide; the modern poultry house must be 15, 18 or 20 feet wide. A few years ago poultry houses were built to accommodate 15 to 20 hens in a flock, and now we are keeping them in flocks of 50 or more, and some of the most successful ranches have come to the point where they are keeping 100 hens in a flock, and in some cases they are keeping 200, and in some cases as high as 500 hens in a single flock. I am not prepared to say that I believe we have reached a point where we can recommend more than 100 hens in a flock, but I am perfectly certain we can keep from 50 to 100 hens and make more money and handle them with less expense than we did formerly. Whenever we divide our flocks we increase our labor, and when we increase the size of the flock we decrease the labor as well as the cost of the house; so you see if we can get one flock of 100 instead of four flocks of 25 we decrease the actual labor.

We have also come to the belief that we can confine our hens to closer floor space than we used to think possible. The poultry books and papers of ten years ago were full of recommendations that you had to allow from 8 to 10 and even 12 square feet of floor space per hen. Within recent years we have been getting it down to 3, 4, 5, and 6 square feet, and some people are putting them even closer. I believe that with Leghorns it is wise to get as low as four square feet. Last year, at the University we tried 2½ square feet as compared to 5 feet, and the hens that had the larger floor space did best, and the hens that fell behind on account of the congestion made up for it in the summer season. In a larger pen it is less necessary that we allow a large amount of floor space per hen because a hen in a small flock in a small house with four square feet of floor space has not as large a room to exercise as she would have if she were in a large house with a large flock and with the same amount of floor space per hen, because she has liberty to trespass upon the floor space of all the other hens. These modern houses have been cheapened by our reducing the size of them up and down. We have lowered our hen houses because it is less expensive to build a low house than a high house. The one unit in estimating the value of a hen house is the amount of floor space per hen. Therefore, if we can reduce the height of the wall and lower the roof, it will save in the expense of the house.

Q.—How low can you build them?

A.—As low as the house can be built and do the work conveniently.

Q.—A good deal lower for you than it would be for Mr. Baldwin?

A.—A good deal, and that is where I have the advantage. We must realize the fact that we spend vastly more money in the construction of hen houses to accommodate ourselves in doing the work than we do in building the houses, because the hens need that large amount of air space. The ordinary rule for building a barn for cows in the modern stable is to allow one square foot of air space for each pound of live weight, and when you come to put that rule into effect in building a hen house, the house does not require to be very high. Supposing a hen weights four pounds and she is allowed four square feet of floor space. If we give that hen a square foot of air space for the pound of live weight, all that is necessary is to raise it a foot high. If you build a hen house and allow each hen what is allowed in the ordinary dairy barn, the hen house would be just one foot high, but when we are building a hen house we must have it five or six feet high in order to work in it properly. One advantage in having a small space is that there is more body heat to warm up the house. The man who builds his house with an allev-way in it compels his hens to warm up the alley-way.

We used to think it necessary to build double walls and stuff them with saw-dust or hay to make them tight and keep the house warm. We thought that the most important principle in egg production in winter was to keep the hen house warm. I would not question for a minute the philosophy that the hen will lay better, if other conditions were equal, in a moderately warm hen house than she would in a cold one, but as between the hen breathing bad air and living in a warm house, I would take the latter proposition every single time. And so we find that in getting fresh air conditions into a hen house it is not necessary to have these houses double boarded and papered. All that is necessary, is to have single boarding with tight joints, and upon the exposed locations add a coating of building paper and in that way we can make a house just as warm as it needs to be. We can add considerably to the warmth of that house by double boarding just at one point. Supposing you are building a slant roof house, and you are going to place your nest arrangement against the north wall, by putting the 2x4 plate edge ways, we are able to set up above the perches and back of the perches down as far as the bottom of the nesting boxes a space where the air can circulate up between the rafters and out, so that the double boarding at that point is not dead air space, but it will cause circulation of air and that keeps the double boarding from ever becoming very cold and keeps it from condensing moisture and keeps it from cooling off the air right where the hens are.

The modern hen house has been cheapened in the front by permitting us to use cheap material, such as cloth. It is not necessary for us to put in an elaborate ventilating system. I believe it is quite unnecessary to put in a straw loft to fill up the large roof space. You should have the least space that you cannot get at, so that you can whitewash every part of it, and where the sunlight can strike every part of the house, and if that house has been made tight on all sides, including the floor and roof, it does not seem to me to matter very much what the front of that hen house is.

Q.—What kind of a floor would you use?

A.—A cement floor.

Q.—How thick?

A.—It need not be more than an inch for the top coat, or more than two or three inches for the first coat on which the floor rests.

Q.—How strong would you make the first coat?

A.—One part Portland Cement and three parts of sharp sand and five parts of gravel or fine sand.

Q.—Do you pound that very much?

A.—Pound that very hard. First of all put a bed of cinders or gravel or fine sand.

Q.—Do you wet the cinders?

A.—They should be made wet. It will take the moisture out of the cement floor too rapidly and cause it to crumble if you do not.

Q.—How do you make your finishing coat?

A.—One to three; if you have a room twelve feet square it should be blocked off into spaces of three feet square. I do not know that it makes much difference whether it is very smooth or not. Sand and altogether it costs us between six and seven cents a foot, and when it is done, it is done for all time, and it is the driest kind of floor, and it is the easiest kind of a floor to clean, and it is not a cold floor, if it is covered with straw as it ought to be always covered.

Q.—Do you think it is essential to make the cement that thick?

A.—I do not know, we build it that way. I rather think it could be built lighter than that. It used to be thought necessary that we should go down two feet into the ground for the foundation. I question whether it is necessary to go down more than 12 or 18 inches. There is no necessity for building a wall that averages more than six inches wide.

We are building a new house 226 feet long with 23 pens in it, and we have built the wall only four inches wide at the top, straight on the outside and running down six inches.

Q.—How far is the top of your wall above the ground?

A.—Six inches. The wall is six inches above the floor, in order to keep the straw from getting out of the house, every time we open and shut the door. When you build a cement floor right on the top of the soil the moisture will come through the soil by capillary attraction and will strike against that floor and you get a diffusion of moisture through there that makes a damp floor and the straw will absorb it and the floor will be wet; you can cut that off by having your cement grouted and the moisture does not get through.

Q.—Don't you think a foot of cinders and six inches of cement would be sufficient?

A.—We are going to try putting down fine sand or cinders for a drainage. It is very easy to build your floor and foundation all in one and then build your house on top of it afterwards.

With regard to cloth curtains I have letters from people in New York State living within five or ten miles of one another, and one condemned the cloth curtain and the other man said he would not take $150 for the knowledge he gained by just using those curtains. We find it makes a good deal of difference how the hen house is built. If the house is loose in its construction, the curtain will not work. Whereas if the house is built tight on all sides except the front it works better, but we have found that it is necessary to take out the muslin front of our house and put in cheese-cloth in order to get a proper change of air. How much cloth you should use and the thickness will depend upon the question of how tight the house should be.

Q.—Do you ever try burlap?

A.—Yes, that makes the house too dark. It lets the air through easier than cheese-cloth. (Applause.)

STRONG AND WEAK VITALITY IN POULTRY.

By Prof. James E. Rice, Cornell University, Ithaca, New York.

It seems almost out of place for me to speak on this subject of strong and low vitality at a place where that subject is so much thought of as here. Prof. Graham has preached on this subject for years, and I think some of the strongest type of vitality I have seen are to be found here. Nevertheless, there may be some of you here who have not heard that message, and for that reason Prof. Graham asked to place me on the programme for discussion on this question. To my mind the most important problem to-day is for the poultry-man to have the ability to renew his flock. More failures have occurred from that one cause than from all the other causes put together. The failure to renew the flock has been due, of course, to many contributory causes, some of them due to improper housing, some improper methods of feeding, some improper methods of incubation, and some improper methods of breeding; but I believe that much of the trouble has been due to the lack of appreciation, on the part of the person collecting a breeding stock and the importance of choosing fowls of well-known vitality. Now, the question of selecting for vitality is all the way through the whole history of the fowl from the egg to the baby chick, the chicken partly grown and the fully matured fowl.

To begin at the beginning, the egg should be fully developed and of normal size, laid by a matured fowl of the ideal shape and vigor, an egg that is perfect in its shell, shape, and size. It is pretty well proven that eggs that show weakness in any part show that there is a lack of health on the part of the hen—some contributory cause that produces a weak-shelled egg—and if the shell is weak we have every reason to believe that the inside of the egg is usually weak, and we would, therefore, get a weak chicken: so that we must begin by selecting the egg if we want a strong chick. I do not believe we should help chickens out of the shell. I have helped them out and I have seen them grow and overcome their weakness, and yet I believe as a matter of policy we have got to fight it at every point, and we must kill weakness whenever we see it, and we should not undertake to help the little fellows that show signs of weakness. If you can see chickens improperly incubated and perfectly incubated, you will see that some came out covered with a good down, large and full of life, squirming and full of vigour, and they have little eyes that stand out like shoe-buttons, they are so black and bright, and this is one of the best indications; and they have shanks that are fat and plump as compared with the little shrivelled up shanks of the weak ones. They have a beak that is short and thick, and of a good color as compared with a pale beak. I believe in the large, commercial ranges. We must come to the point of eliminating these birds, putting them by themselves beyond any possible chance of ever getting in our breeding stock. When they are getting their chick feathers we have another period in their lives when they tend to show their low vitality. We have started a line of investigation at the University that we hope to carry on for a good many years to come. We selected brothers and sisters of white Leghorns, hatched in the same machine and in the same process, and yet some of these chicks, from the very start and continuing right straight through, up to the present time, show normal, vigorous, healthy, while others show delicacy and low vitality. We went in there and picked out all these low-vitality chickens and marked them, and leg-bandaged and numbered them, and we did the same thing with the strong, vigorous

chicks. We did not take a chicken that had low vitality that we felt would probably not live; because there would be no use in spoiling our experiment in that way.

And you can see the difference between these chickens when they weigh two pounds apiece and later when they were put into winter quarters. The time will come when they have reached the limit of their resources, and they will not be able to produce eggs. It will show especially in the moulting time, when they are asked to reproduce and put on a new coat of feathers. We have six experiments on the way, two of White Leghorns and one of barred Plymouth Rocks. The White Leghorns, strong, averaged 3-3-10 pounds; the weak 2 8-10 pounds, almost no difference in size. The total number of eggs laid by 25 of weak vitality was 287; the total number of eggs laid by strong vitality, 315. Value of eggs, $9.25, for the weak; $10.40, for the strong. For the second experiment the weak averaged 3 8-10, the strong 3 9-10. The weak laid 198 eggs, the strong 275. Value of the eggs of the weak was $6.36, of the strong, $9.10. The cost of feed for the weak was $2.10, of the strong $3.18. The strongest contrast is between the Barred Rocks. The 25 weak averaged 4 6-10 pounds apiece and the strong 6 3-10 pounds apiece. The cost of feed was $4.20 for the weak and $5.48 for the strong. The weak ate more food in comparison to the value of the eggs they produced than the strong. Those of you who go to Cornell to attend the Poultry Institute will be able to see these pens and see for yourself whether there is a contrast in the shape and size.

In some cases these chickens that were weak have overcome it to an extent that you hardly would be able to tell them now from the strong; just the same as a child born weak by being kept under the finest kind of conditions overcomes that weakness and eventually grows up to be strong. Yet, if we know anything about the law of heredity, like producing like, there will always be a tendency of the individual that was once of low vitality to break down or reproduce that weakness.

We then come to the problem of picking out the strong and the weak for breeding purposes, going right into the pen and picking out those fowls that show strong vitality. I believe that we can pick them out so that when we put them into the breeding pens they will give us strong or low vitality according to the birds we selected. It does not necessarily follow that if we picked out a hen who is now showing low vitality that she would produce chicks of low vitality. I picked out a hen of low vitality, and Prof. Graham said, "Don't take her, she is too well-known, she has a wonderful record behind her." It is not an indication that that hen has not been a hen of strong vitality. She might be of low vitality because of that heavy egg production. I have seen hens of the strongest possible physical strength the picture of health and had never laid an egg. There was no reason in the world why they should not be strong, healthy, and vigorous. I maintain that no matter how good a trap-nest record you have, and how great a reproduction power the hen may have, if at the time she produces these eggs she is of low vitality her chicks may be of low vitality. Sometimes the very fact that a hen is the best hen that we have got on our place will indicate she is not a good hen to breed from. The best hen we have got on our place at the present time, hen No. 61, laid 216 eggs in the first ten months of her laying period; she was most vigorous and could give us the most fertile eggs, and the most hatchable eggs out of seventy hens. Her record shows right straight through that she was one of the most reliable hens in the whole place. She had a constitution that would stand up under heavy feeding.

Q.—What about her chickens?

A.—We did not carry through the experiment to the extent of getting individual record of her chicks. The time will come in the life of every hen when she will reach her limit. That hen has been the best hen this year. I am convinced that for the future the poultryman must look for great improvement in the breeding of his fowls. Not so much to the production of hens that will lay phenomenal records, 250 or 300 eggs in a year; but I believe we must look for a hen that will produce a large number of eggs, larger than we are getting now, and continue to produce these eggs for a number of years. The weak link in the poultry business is the fact that we are depending upon eggs for only one or two years and a dairyman can start his cow and when he gets her perfect he is able to use her 5, 10, or 15 years. But when we get a hen we are only able to use her for a few years. I believe we have got to go to breeding from mature fowls and keep them for a number of years; then if she does not pay us from a commercial standpoint to produce eggs for the market she will pay us because in her body she has that strong constitution, comparable, if you like, with the good old people who lived to 80 or 100 years, while their sons and daughters cannot continue to that same length of time. I believe the tendency for longevity, and strength, and power is a thing we must cultivate, develop and breed into our poultry. We want a long-time production hen, rather than a hen that is going to exhaust all her resources in the first year.

Mr. GRAHAM: Do you find the majority of your heavy-laying hens are good for five or six years?

A.—I do not know. We have on the place, a pen of hens five years old, they are White Leghorns, and they were selected for no other purpose than simply because they came through strong and vigorous, and were fine individuals. We never had any trap-nest records of these hens. Last fall we put these hens into trap-nest experiments, and we are going to know by a year from next fall how many eggs each one of these hens lay. This is her third winter for hen No. 61.

Q.—How is she doing now?

A.—I cannot tell you what she is doing at the present time. I did not look at her record.

Q.—Is she a winter layer or a summer layer?

A.—She was the last hen out of 70; she moulted along in the middle of November, and then she rested for about two months. He egg record began about the first of January. She had been laying the first day we put our trap-nests in, and we did not know how many she laid before the experiment began, but we have a record of her laying 215.

Q.—If you sort out your hens on the 15th of October, do you find that the majority of hens in full feather are good layers?

A.—It is not always true, but the best producers we have are the hens that moult last. They have been so thoroughly civilized and developed in that quality of reproduction that they continue to do the thing that is most normal, and, in doing so they failed to renew their coats, whereas some of the hens that have been the poorest in the flock have moulted first.

PROF. GRAHAM: That is exactly our experience. We go through our flocks in the middle of October and we take up the hens that have not laid a certain number of eggs, and it seems very striking that among our latest moulters were our very best hens.

Q.—Did you find that these heavy-laying hens moult quicker?

A.—They did, they moulted sooner, but they did not get their feathers on quicker. You cannot always tell by the present physical condition just what the reproductive power of every fowl is.

Mr. Nix: Don't you think that at that particular period that physical appearance would be misleading?

A.—Yes.

Q.—What better indication would you want than a high egg record of vitality?

A.—It might be good, but I question the advisability of using the hen that showed as low vitality at that time. She might be a good hen to keep, but I do not think she is a good hen to put in the breeding pen.

Q.—Is there an egg type?

A.—I think there is.

Q.—Is it different from the meat type?

A.—We took out a score card for the meat type. We took out twenty-four Plymouth Rocks and separated them into two lots—the wheat from the chaff. We put into one pen those that were of the best meat type, and into another pen we put the culls, and we get more eggs from those we called the meat type than we did from the others. I believe there is an essential difference between the best egg type fowl and the best meat fowl. I do not believe the person lives who can pick out a fowl and say it is one of the best egg producers.

We have found hens that in their general appearance were almost everything that we generally understand to be egg type, and yet they were not good layers. We have, by calliper measurements and by the use of scales and in other ways, found that there is such a thing as an egg type. We have just worked on the White Leghorns and the Barred Plymouth Rocks.

Strong production is associated with strong nervous disposition. The egg producer is a motherly hen, and they will show mentality. They will be the most intelligent hen you have in the bunch. That hen, No. 61, is the most intelligent hen we have. You can handle her, and yet if she did not want you to catch her, she knows how to get away from you. She was in an experiment where every hen had been dipped in dyes. Every single bird of these 250 hens were picked up and personally examined, a record made of the conditions of the moult in different sections of the fowl's body, and whenever you drove the hens into the catching-frame, that hen (61) was the last hen to go through the hole. She always managed to get away; she showed mentality. That hen had brains. The same thing is true of the best dairy cow and the best horse; they are animals of strong mentality.

There is as much difference between this hen as there is between the greyhound and the bull-dog. Just as in the development of a foot-ball team, the man that plays centre field cannot play quarter-back.

How are we going to select for physical vigor? These I have selected did not show as well as they did at Pennsylvania State College a few weeks ago, when I picked something like a dozen pairs—Barred Rocks, White Leghorns, Minorcas, Rhode Island Reds, and the like, and they were ranged up in cages clear across the room, and as I walked down in front of these cages the points to which I alluded were so sharp and marked that the audience applauded. The physical types were shown by contrast. You cannot see them here, because Prof. Graham has not got as much low vitality here as there are in a good many flocks in the country, and for that reason I cannot find what I would like to get. If you go to Cornell I will show it to you. We have twenty males running out in the yard representing low vitality and twenty representing strong vitality, and we keep them for no other purpose than simply to show our students.

You can see at a glance that in this cockerel you have a large, physically strong, sturdy individual. You can see it in every outline as compared with other ones. The first thing is a general impression of the physical strength, the blockiness, the compactness of the outline of the fowl. The second point is the indication of life and vitality, as shown by the way they stand, the way they carry themselves. Whenever you find a weakness you will find a disposition of fear; it will manifest itself. Josh Billings once said that he "loved the rooster for the crow that was in him, and the spurs that were on him to back up the crow." The hen that is sick or weak or tired or of low vitality usually carries her tail down instead of up; a strong fowl of strong vitality shows a good thick shank. The head shows up pretty well, has a large comb and face appendages show greater power and greater physical strength. I have seen weak fowls with very strong combs, but when you compare Brahma with Brahma, or Leghorn with Leghorn, the comb and face appendages is one of the marks of strong vitality, as compared with weak vitality, strong physical power as compared with the low.

Prof. GRAHAM: Are all our weak producing cockerels very light in the comb and light in the wattle?

Mr. RICE: The comb point is an indication of physical vigour. A hen carries her health certificate right on top of her head. It is one of the evidences that the blood is circulating properly. In our first experiment we put twelve Leghorns in a pen with a glass front and twelve in another house with a cloth front. These were brothers, fed just alike and every condition was just alike, except that one was kept in a close sultry air and the others were kept in the fresh bright air; and in six weeks' time you could have trusted any person in this audience to have mixed these fowls up and then pick them out and put them right back into their own pens just from the appearance of the fowls. One of the most marked conditions of the whole thing was that, in spite of the fact that they all had straight combs when they went there, there was only one cockerel out of the twelve in the house with the glass windows where they had gone down to low vitality—there was only one that still had a straight comb.

Prof. GRAHAM: If you put a chicken in a close house and feed it plenty of meat you will get a large comb.

Mr. BALDWIN: Does not a large comb come from feeding a chicken at a certain age? If a chicken at the age of two or three months gets a large amount of meat it will get a good development of comb.

Q.—What would early or late maturity indicate as to comb?

A.—I believe early or late maturity indicates strong vitality. I have seen chickens that matured late come up to full strength and power. A fowl that has got a long joint and a weak breast and a long neck, and of a generally a consumptive type usually has a long flat crow head.

Strong physical power is associated with a bulkier head, and with a thick curved beak. I believe, as far as I have observed, that you will find more weak fowls of the crow-head type than you will of the thick type. A fowl that has low vitality is likely to have knock-knees and stand upon the feet close together, and a fowl of low vitality is likely to stay upon the roost, it will be the last one to get off in the morning and the first one to get up there at night.

If you go into the hen-house in the morning and see the ones that are on the perch, you are very likely to find the fowls that are of low vitality. They are not full of snap and vigour.

Another point that indicates low vitality is a cold shank. It is one of the best indications of a roupy condition.

Q.—Would you advise picking out the hens that moult first and kill them?

A.—I do not think it would be fair to kill off the hens that moult first, but I feel pretty sure, as far as my own practical experience goes, that if I were cleaning out in the fall of the year, that if a hen looked ragged in the fall, I should not want to discard that hen on the strength of that physical examination, as she might be one of the best hens we had, as far as her good laying powers were concerned.

Q.—What about a hen being too fat?

A. I don't know just where we are at in that regard.

Last fall we killed all the hens in one of our experiments, and we found that the fattest hens were the hens that were in the best laying condition, and since that time we have been making very careful observations along that point. A hen to be in a good laying condition must have fat in her body. The production of eggs is based upon the fact that the hen has lots of stored up energy in her condition; and a hen cannot lay an egg until she has got fat in her body, because that yolk on an egg is about half fat and she has got to have oil there to make the first part of the egg. The three fattest hens we killed were in the best laying condition, and the three poorest hens we turned out by themselves, and there was not the faintest chance of their laying for two or three months. They were not poor hens in the sense of being thin. They simply did not have a large amount of fat in their bodies. How are we to feed a flock of hens? We cannot feed the individual according to their immediate needs. The dairyman is in a different position, as he can feed each cow just all she requires.

Q.—Have not you found that sometimes a hen has eggs that are not in the proper place?

A.—We found one hen that had two eggs absolutely firm and grown fast to the ovarian wall, and we found one hen that had an egg that had gone through the ovaduct wall and was outside. This was caused by a rupture.

Prof. GRAHAM: If you keep putting feed into a hen do you think she will eat too much?

A.—They do not seem to eat more than they require.

Q.—What effect has in-breeding on vitality?

A.—All our breeds have been built up on the basis of selecting and breeding to emphasize certain points, but nearly always where it has been successful the man has coupled with it the desire to select the most vigorous. I cannot feel but that there is something in physical vigor by the blending of different bloods. Some of the best breeders do not believe there is anything in it.

Q.—Do you believe you can increase vigor by in-breeding?

A.—Yes, just as much as you can increase the form. I think the fowl you have got is a good example of what you can do in that way.

Prof. GRAHAM: For six years there has been no new blood put in at all.

Mr. BALDWIN: We appreciate very much what Professor Rice has told us this morning. He has given us quite a lot of strong and very good advice that we should put into practical use

MY EXPERIENCE IN THE PRODUCTION OF EGGS.

By W. R. Curtiss, Ransomville, N.Y.

I have never before tried to talk to a lot of people. However, I am very much interested in poultry. I have never done anything else but raise fowl. I started right from a boy, and I have grown into it. I thought I would like to come over here and attend your Institute. I am not going to try to give you the best way to get eggs; I am only going to tell you how we get eggs and get them at a profit.

In the first place you want a good soil to build your house on; you want a soil easily drained and then you want a good house to house your pullets in. We have a house that we experimented with this year, and so far it has been very satisfactory, both from points of production of eggs and from points of ease in taking care of the house with a very small amount of labor. We are housing two thousand layers, and one man tells me that if I would build houses like this one that he would take care of the whole bunch; therefore, I think it is quite a saving. This house is sixteen feet wide, but I would prefer to have it twenty-four. The length of it is fifty feet; that is a compartment in a long house. It has windows on the south side and between every two windows there is a door, and there is a roosting pen in each compartment.

Q.—How many windows to the pen?

A.—This is just one pen; there are two windows and a door between, then two windows more and a door. Between the two windows and the door there is a space of about two feet wide; enough so that you can get a runway for the hens to go out in the end of the pen. We have a roosting room; it is either the east or the west end. There is a walk between the roosting room on the south side and the outside of the house. The north side of roosting room is up against the back part of the house, with an air space on top, on the side, and at the bottom, and I have failed to find a particle of frost on that roosting house. We never shut our hens up at night.

Mr. Baldwin: Do you mean you have no sign of the collection of frost on the wall?

A.—No sign of the collection of frost on the walls. We never shut our hens up close at night. In the day time they are wide open, we always leave the run-holes open; they are not closed at night, it does not make any difference how cold it gets. We never have frost over ten degrees below zero. We say, if a hen should have fresh air during the daytime she ought to have it at night. We have tried curtains, and they are no good, or too much trouble, They have got to be renewed every year, and they get dirty and clogged up with dust, and I think I would rather take the air first hand, instead of second hand. We do not use any curtain at all, but throw the door right open, and the door of the roosting room is open in the daytime. The hens are in this shed in the day time, and at night they are back into the roosting room. There is an opening along the floor in the roosting room. In this pen we put two-hundred hens, and this winter it has given us an average of forty to forty-five per cent in eggs, and we can take care of that amount of fowl just as quick as we can take care of a pen of twenty-five. If I were building a house now, I would build it twenty-four feet wide and I would put two hundred and fifty hens in a flock. We have not had as good results from twenty-five in a flock as we have had from two hundred and fifty.

Q.—Is there any glass in this roosting room?

A.—Just enough light for them to go in and roost, and we have the nest boxes in there. We have not had a hen eat an egg in these pens. They seem to like to go into a place which is dark to lay; they go in there and get up into the nests to lay. We have a board in front of the run-way and the air comes in through the hole, and then goes up over this board and into the pen, and we do not get a draft, but we get ventilation.

Q.— How big is your largest flock now?

A.—Two hundred and fifty. We have a large number of these colony houses and we group them. We have as many as three hundred in a group; we have nine of them with forty Leghorns in each house.

Q.—What kind of a roof do you have on that twenty-four foot house?

A.—Just as flat as I can build it. A gable roof. We do not like the shed roof, because it is so low at the back that you cannot get in to work. We clean out our house at the north side, and we want a drive-way that we can drive along and clean out the houses. We like tongued and grooved boards all right, but still we like a coating of paper over that because it breaks the wind; wind will not go through paper like it would through wood. Underneath this house we have a two foot space of board floor. We have doors at each end that we can open and we let the air whistle through there. If you get a damp floor you cannot get eggs.

Q.—Don't you think you can have a dry earth floor, if you had it a foot and a half above the ground?

A.—Yes, you could; but I do not think it is as good as a board floor. I think a cement floor is a good thing in a duck house. In the spring, just as soon as the snow is off, we put the hens out in the colony houses. We select our pullets for vigor and size; we like a pretty good sized pullet. We put them in the houses in September; we take them when they are just starting to shoot the comb. What I mean by that is when it starts to turn red; if the comb is pale we do not take her. We start to feed for eggs in September. We do not close these houses up; the windows are taken out and the doors wide open. As soon as it comes real cold weather, we gradually close it, put in the top windows first, and then gradually put in the lower ones. We start to feed these pullets on mash feed. We have tried dry mash but we do not like it. We feed them mash twice a day, morning and night, and we give them grain to dig for in the winter.

During the day we are supposed to go through at ten o'clock, and again at noon and at three o'clock to scatter grain. The idea is to stir the hens up, especially in cold weather; we will go through them more than we do in warm weather. We find the eggs do not chill in this roosting room. We simply use the ordinary water pails set up on a box so that the hens can get up and drink We try to get our hens out of doors in the winter, we do everything we can to get them out of doors. If we have a snow storm, we shovel out in front of the house and give the hens a good space in front and throw out the litter, and we feed out in the front and we get the hens to come out and work in the sunshine. We find as soon as we get a little warm weather and get the hens out doors, the egg record will go away up, right off.

For the mash we use equal parts of corn meal and bran, four parts of corn and four parts of bran, and two parts of low grade flour, and one part of meat scrap. For fattening ducks we use green bone. We reduce it and make it into soup for laying hens. We have a tank that will hold ten barrels, and we get a horse or a cow as long as it is not diseased, and we put it in this tank, and we dissolve the bones so there is nothing left but juice and this is pretty good. We cook this beef so that it will come off the

bone; then we mix in the mash and we use ten per cent. meat. We tried using more meat but it was a failure. We throw the hens right into the moult at once if we do that.

Q.—Do you prefer that to cut bone?

A.—Yes, by all means.

Q.—Do you cut this meat up at all?

A.—There is more or less meat hanging to the bones and for the winter layers we give this meat, and we carry the bone up to the breeding stock, that we are carrying over, and we let the hens pick it over. Hens won't stand the cold weather in a small house like they will in a large house.

Q.—Do you use any of the liquids in this mash?

A.—The liquids are put away and stored for fattening ducks in the spring.

Q.—Do you consider the volume of this cooked meat equal to the volume of the meat scrap?

A.—I think it beats it. There is something they put into this beef scrap that does the fowls harm. We have fed twenty per cent. meat with no further result than to stop the laying and make them moult. It is a question in our minds now, whether we will buy any more beef scrap. If we can get this meat so that we can use it for small chicks and ducks, we are going to use it.

Q.—Will that stuff keep?

A.—In the summer time we have to use it quick, but in the winter time we have ten or fifteen barrels ahead. We set it out of doors and it freezes up hard, and when we want to use it we take it inside and thaw it out.

Q.—Do you think you get as good results as you would if you boiled it down and made it into soup?

A.—I know we would not, because we tried that; we fed it to the hens in the upper field and we got no eggs at all. When we went to feed meat then eggs came, and they jumped from 5 to 6 eggs a day to nearly 100 a day in a flock of 1,500 hens.

Q.—What do you moisten the mash with?

A.—Hot water. We put in four parts of cut clover hay; we scald that with water and let it stand for four or five minutes, until thoroughly steamed, just the same as you would make tea.

Q.—Is it cut short?

A.—Yes. Our machine cuts one-eighth of an inch, and then we run it over a screen and take out all the long stems. It is very fine cut clover; we thoroughly scald it, and when we take it out it is almost as green as when it came out of the field. We mix the feed up dry with a shovel, and then we put the clover on top and work it through. We feed them all they will eat of this stuff, and if there is a little left over, we never take it up.

Q.—If there was much left over it would freeze?

A.—If it freezes you will have to let it stay there until it thaws out. We feed the same thing at three o'clock in the afternoon. We have had individual flocks that have laid as high as sixty or seventy per cent., and I suppose the meat has more to do with the production of eggs than anything else. I believe I could do away with the green food entirely if I could get meat. We feed cabbages every other day. You must not let any cabbage be left over in the pen; it is about the worst thing you can do. We just feed as much cabbage as they will eat up; we put the head right in.

Q.—Do you think the Rocks or Wyandottes would get too fat?

A.—It just depends on whether they were yearlings or pullets. I would not have a yearling hen for eggs. I do not think there is any money in it from the egg standpoint, but from hatching it is a different matter. I would not feed that way for eggs for hatching.

I will tell you how to feed to get the largest number of eggs to put on the market in the winter when the eggs are a high price. We get five hundred yearling hens to breed from. I do not know that the fertility is any better, but the chicks are stronger and live better. Just as soon as the winter breaks up and we think we are not going to get any more snow, we take these colony houses and put the hens in them. The house we use is eight feet wide and twelve feet long. We used to have a straw loft, but we have practically discarded that now. In the spring we put fifty Wyandotte hens in this house. I have had as high as eighty Leghorns in one of these houses. They are just roosting houses in the summer. The back half is all roosts, and in the front half there is a water pail and the grit, and the shell boxes, and a little shavings on the floor. We prefer shavings to straw; they are simply put in as an absorbent. There is no drop board; it takes too much time to clean them out. We clean out the hen houses once or twice a year. Then we go through these houses once or twice a week in the winter, and cover the drops with shavings and we find that it disinfects the house so that there is practically no smell.

We put one thousand hens in a five acre field, and they stay in their own houses. When they are first taken out they are kept in for one day, and the next day they are let out just before dark, and the next day at three o'clock, and the next day at noon, and after that they are let go and they seem to be healthy and well. We raise the house up and put blocks under, and in case there is no shade in the field, you will find at noon time the hens will be under the house. We just use the ordinary orange boxes for nests open in the front and closed on all the sides. The hens remain in these houses until it snows and we get stormy weather, then the yearling breeders are kept out for another year for breeding, and the rest are put on the market. We always keep the best ourselves. In picking out our breeding stock we always select the best; not too large, but a good medium-sized bird. We do that in the ducks particularly. In sorting out my breeding stock of ducks I went through ten thousand to get what I am breeding from this year, and I have a thousand breeding ducks. We moult the hens in July and August. We plan to get enough eggs from the hens from July till December to pay for the keep of the hens, and the man's time for taking care of them to the end of the year, and whatever we get out of them after that that is our profit.

Q.—What time do you begin to moult?

A.—The first of July we begin our moulting process.

Q.—What is that?

A.—It is just simply to starve the hens, cut down their ration gradually, keep running them down to a low point of vitality, and when they get away down low, then we start to feed up.

Q.—How long does that take?

A.—About a week to do that, and two weeks to get back again. We get feeding again in pretty good shape by the first of August. The feathers dry up in the skin and die when we get them down low, and when we put this heavy feeding into them, the feathers will drop out, and they will be through moulting and start to lay in September. We will have them all through and laying in six weeks. We feed them meat gradually. You must not feed them a large quantity at the start. They start to lay about the

first of September, and we have had as high as 50 per cent. in October and November. We have the strongest fertility in the eggs. We get White Wyandotte eggs this fall that run over 80 per cent. fertility. I have tried this moulting on the Leghorn hens, and I cannot get any results, and it doesn't seem to work as Leghorn hens lay right through the moult. The only thing we do to the Leghorn hens when they start to moult is to give them more meat in the mash. I would not advise anybody to try and moult a Leghorn.

Q.—Do you confine your hens?

A.—No, they have the run of the field. I think it would be better to run them in a yard, but we do not think it pays us. There is one thing about this moulting that is peculiar, and that is, it will not work on male birds. If you tried that you must take all male birds out, and keep them out until the moulting is over, and then when it is over we put them back with the hens and let them moult when they like. I cannot explain why that is, although I have tried again and again to moult male birds. I think one reason is that it takes longer for a male to moult than a female.

Q.—Do you mate yearling males with yearling hens?

A.—No, we mate cockerels.

Q.—When you get 80 per cent. fertility, how many chicks do you get?

A.—We get better results than we do in the spring. Our White Wyandottes lay mostly all winter, and then they rest for two months and their vigor is renewed.

Q.—Do you hatch 50 per cent. of eggs?

A.—I would venture to say we do. At the Buffalo show we had chickens that came from these hens' eggs laid in November, and we had 136 eggs in the machine, and we got 128 chickens. They were eggs from hens moulted in this way. A breeder went up into the Adirondacks to hatch chickens, and he could not do anything at all, and he asked us to send him some Wyandotte eggs. We sent him some and he wrote back and said he wanted every one of those eggs, and we sold him over 1,000 eggs, and he said, they had phenomenal hatches out of these eggs, but they did not have good luck in raising the chicks.

Q.—What do you feed these hens while they are moulting?

A.—Just simply the difference in the amount of meat in the mash.

Q.—Do you give them less food?

A.—We give them a little less mash each day, finally cut out the mash entirely, and give them a little grain, and then we cut the grain out.

Q.—Do you leave them any length of time without food at all?

A.—Yes.

Q.—How long would that be?

A.—Until we see the first hen look as if she were going to give up the ghost.

Q.—How long would that be?

A.—Some flocks would take longer than others. We simply watch the flock, and when we see a few of them getting weak we start to feed them up again; we come as near as we can and not lose them.

Q.—Then when you get them back you give them more meat?

A.—Until they get their feathers partly in. If we kept this meat up, they would moult again instead of laying.

Q.—Have you ever observed hens moult that have not laid at all?

A.—Yes.

Q.—Have you ever noticed that in one or two experiments, or have you repeated it?

A.—We have moulted hens for five or six years and that is the way we get our eggs for hatching roasters. We have now about 1,000 roasters we hatched out of these eggs, and we have them weighing 2½ lbs. We moved out about 200 before I came away. Last year we had only 200 roasters and we got 25c. a pound for them. I am experimenting now with a pen of White Plymouth Rocks, and breeding them for nothing but size. If I can get one to weigh twelve of fifteen pounds, I would like to do it.

Q.—Why?

A.—White Wyandotte roasters will weigh four or five pounds, and some of them to go six pounds, and that taken at 25c. a pound will bring me $1.50. If I had a chicken that would go to twelve or fifteen pounds, it would not take any more work to take care of it, or to heat or brood it, it would take a little more feed, but I think I could make more money out of it.

Q.—Is there a demand for that kind?

A.—Yes, there is; they will sell more readily than the small ones. I know one man who has been breeding along these lines a good many years, and he has roasters weighing from ten to fifteen pounds each. He showed me some of them, and I was astonished at their size. One person takes care of all my breeding stock on the range; he is only a boy 16 years old. Our Leghorn hens run close to 90 per cent. fertility, but Wyandottes do not do it.

Q.—The Leghorn would be best for the broiler business?

A.—Yes, but we do not go into the broiler business very much, as we do not see very much money in it. Of course, in raising pullets for laying, we have got to raise cockerels, and that is where we get the broilers. In order to get the most money out of our eggs, we have to produce them when they are high. There is a time in the fall when pullets are not quite old enough to lay, and the yearling hens are laying good. We get 45 cents a dozen for our eggs during November and December, and there is great demand for them. Pullets put in in September will be laying a few eggs in November, still they will not get down to business before December. We start hatching the year before in December, and hatch out a lot of pullets. They should never be sold as broilers. They are put in the colony houses in the fall, and they start to lay about June or July and by October and November they are laying in good shape up till about the first of December, and then they are just like old hens, and they moult, but we get the eggs at the times of the year when they are high.

We find that by moving them we can stop the moult. If we ship them a long distance away where there is a different climate, they won't moult in December, and they will start laying again.

I have had men come and want to buy pullets in September and October, and they want early hatched pullets, and they see these hens and they buy them, and in taking them home they stop laying, and they start in again in January and do not moult.

Q.—Have you any idea how many eggs you get from each hen in the year?

A.—We never keep a record for a year on a hen.

Q.—What does it cost you to feed a hen a year?

A.—As near as we can figure it, it costs from 90 c. to $1.00 to keep a Leghorn; a Wyandotte costs $1.25. As far as egg production is concerned, there is nothing to compare with the Leghorn. We have tried a good many breeds and for eggs alone the Leghorn is the only breed, but I do not think the Leghorn makes a very good broiler, we cannot find any profit in crate fattening Leghorns. We put them in a pen 50 by 100, and we give them the heaviest fattening mash we can conceive of, for about ten days, and then we take them out and kill them, and ship them away.

Q.—What do you feed?

A.—Cornmeal: we use no bran at all; about 5 parts of cornmeal to one of flour and one of soup. We use milk when we have it.

ADDRESS.

By G. C. Creelman, President O.A.C., Guelph.

I am sure that it affords me a great deal of pleasure on this occasion, to be with the poultry men at their annual Poultry Institute meetings. You are just closing up your short course work, and I think it is a fitting way to close the short course by having an Institute meeting, at which you have the benefit of hearing the experiences and results of practical work from practical men in the business. We have on the list of speakers on this occasion, the best men that can be secured on the continent of America.

The question of marketing your produce is a very important one. The home market in Ontario has increased greatly during the past few years, and the better the article you put on the market, the more that market will increase.

Our Markets. There is one good thing about the British market, and that is, that while it is conservative, it will stand a good deal after you get it well established. If you succeed in making a name for yourself in that market it will then be pretty hard for somebody else to come in and cut under you, and I believe that if we continue to keep up the quality of the stuff we send to Great Britain, we will always have a market over there, perhaps greater than we at the present time appreciate.

Absolute Honesty. We want absolute honesty in each and every branch of agriculture. There is just a tendency of the times at present for a little dishonesty, and I am sorry that it has crept into this country. Some men will be honest just so long as it pays them, or they will be strictly honest in their business until they are found out. Sharp practices are now considered good business methods. I am not speaking of poultry men, in particular, but this fact remains that we do not always in the show ring act strictly honest, and in the material we send to the market we are not always strictly honest, and we should be if we are going to make an enviable reputation.

Absolute Truth. There is a certain amount of absolute truth already known about the poultry business. It is lamentable to have young men come to us, who have bred poultry for years, and yet have not learned anything about the business itself: and so long as poultry is considered a side issue, and so long as it is good enough for girls and not good enough for the men to bother their heads about, then it will not be given a very careful study, and the work will be done in a sort of a hap-hazard way. If the chickens make anything, all right; and if they eat their heads off, all right too. From this time on we must put our feet down squarely on that kind of thing if we are going to help the general farmer, and it seems to me that is where the chicken business belongs. The average farmer must put more intelligence into the business of chicken raising. If any member of the family is going to make a business of it, then there is an absolute necessity for more knowledge on the subject. There are certain things that are already proven, and it is not necessary for me to enumerate them to you, but there are certain things in connection with your business that you have

quit experimenting on. You know that certain causes will produce certain results; that a certain amount of meat is absolutely necessary for a large production of eggs; that a certain temperature, not too hot or too cold, is best; that a certain amount of shade in the runs is necessary if you are going to get the best results in the summer time; that it is not good to let these chickens get too cold or be exposed to draughts in cold weather, if you want good results. These things are not generally known by the farmers in the Province of Ontario and they should be. Our farmers must be shown where they can make more money in this poultry business, because they are the men who must build up this poultry business, in the Province of Ontario. You must not forget in your discussion and in your lectures that your work is going to be sent out in the form of a report to be read by the farmers throughout the Province and don't forget to discuss some of the ordinary things about feeding chickens and hatching them and the ordinary way in which it is done by ordinary men and how best to get a large proportion of these chickens to a place where the farmers can receive the most money for the amount invested in the business. We are trying to do that kind of work in this college. We sometimes find ourselves wrapped up in scientific discussion that does not amount to a great deal. The principles that will apply to the business generally should be discussed. We have to watch ourselves at all times that we keep the discussion down to a place where the average farmer will get the benefit, because he is the man after all that we must look after. We must give the benefit to the farmer.

Absolute Exactness. I want to make a plea for absolute exactitude. Get away from guess work. I would like to see this poultry business,—which has for many years been considered an issue in which there was not anything absolutely known in connection with it—get down very soon to a practical basis. In the old days it was all very well to let the chickens scratch up everything about the place, and let them eat up the tailings from the threshing machine, and it was thought to be a necessity to have them around in order to get a few eggs sometimes when everybody else had eggs, and it was a practice to raise poultry in a slipshod way; but I say now we should get down to absolute exactness in some of these things. The truth which is known should be sent broadcast throughout the length and breadth of this land so that this rule of thumb and slipshod methods should be stopped right away.

I know we young men are apt to be too enthusiastic. When I was in charge of the Farmers' Institute I knew certain things were absolutely wrong and I wanted everybody to know it before I went to sleep, and people said that I was too anxious, and could not make it go that way. Perhaps we are in too much of a hurry, but what I ask is that these things that are absolutely known,—literature that is absolutely correct, experiments that have been tried and proven,—these things should be circulated and the farmers should be made acquainted with them.

Absolute Saving of Time. One thing more to the young men before me who are just entering the poultry business. If I had the whole student-body of the college here (there are over 200 of them now studying in their rooms) I do not know anything that I would feel more like saying, from the bottom of my heart, from my experience and observation, than the absolute necessity for not wasting so much time. I do not know how to impress that upon the young poultry men here. There are so many things that you do not know, and there are so many men with information that you need, whom you ought to be talking to day after day, hour after hour, and minute after minute, and yet you actually will talk for hours with

your sister, or father, or mother, and chums on topics of no importance whatever, even after you have grown up to the age of discretion, wasting time every day when you ought to be looking for this knowledge. That impresses me more than any of the vices that are common to this country; more than the vice of drinking whiskey; more than the chance of your becoming a drunkard. I believe there is more danger in the habit of wasting time in discussing useless things and listening to some story over and over again, and using common expressions that you thought were smart when you first heard them, but have lost their savor many times. You should drop that kind of talk and get something new to say, something to speak about, and something to think about. Get away from the man who discusses all around the same thing, and spend a half-hour or an hour every day for study, thinking over plans for work you are going to do. Sit down and think things over and as far as possible save time.

CO-OPERATION AS THE BEST MEANS OF SELLING POULTRY PRODUCTS.

By W. L. Smith, Editor "The Sun," Toronto.

In dealing with the poultry industry, whether in the matter of production or marketing, the first thing necessary is to rid our minds of the idea too commonly held that poultry-raising is necessarily a matter of small importance. The industry is really one of very considerable value, and should become of much greater value than it is to-day.

Reports of the Bureau of Industries give some idea of how important the poultry branch of agriculture is, but I have reason for believing that the statistics given by the Bureau on this point under estimate the actual condition. Moreover, these statistics are not complete; they give us an estimate of the poultry sold and slaughtered, but do not take any account whatever of the volume of egg production. But taking the statistics in the Bureau's report as a basis, and without troubling you with the details of the calculation made, I think it is safe to say that the value of the poultry crop of Ontario last year, including both eggs and marketable birds, amounted to not much, if any less, than four million dollars. That means that there was received from poultry last year $1 in value for every $6 realized on all the cattle sold or slaughtered in the province; that the returns from poultry equalled close on one-fifth the returns from swine, and were well on to one million and a half in excess of the value of the sheep killed for the farmers' own use or sold in the public market. It is then, no small industry, the prosperity of which you are seeking to promote

Moreover, poultry production is a line in which there is room for almost indefinite extension. The British market, in which is found profitable sale for so many of our agricultural products, is ready to take almost unlimited quantities of poultry and eggs. The city of London alone consumes twenty million dollars worth of eggs annually. In the year ending with October last, the imports of eggs into Great Britain reached the prodigious total of a little over one hundred and eighty million dozen. Of this total one-eighth were sent from Belgium and upwards of one-fifth from Denmark. The Kingdom of Denmark is so small that it might be almost among the mountain ranges of New Ontario, and still that little kingdom sends twenty dozen

eggs to the British market for each dozen sent from the Dominion of Canada. Even if the British market alone was to be considered there would still be an outlet for all the poultry the farmers of Ontario can produce.

There is, however, still the home market to be considered. Home consumption has already reached a very large volume, and would account for vastly greater quantities if products of proper quality were supplied. A hotel in Toronto several years ago put away no less than five tons of poultry in cold storage for the use of its guests. That hotel is using a very much larger quantity of similar products to-day, and there are one or two other Toronto houses which are even larger consumers than the particular one referred to. In no year, taking the whole twelve months through, has there been more poultry on offer, of the right quality, than the local market would have taken care of. There have been occasional gluts, due to lack of system in marketing, and the market has been quite frequently oversupplied with goods of inferior quality. In fact inferiority in quality is one of the most striking features in connection with the supplies received for home consumption. Last week, at Toronto, there was a spread of no less than four cents per pound between the good and poor chickens on offer. The stock in both cases was equally fresh, and the differences in selling price was due to three causes: (1) unfinished condition of birds when killed; (2) improper dressing; (3) lack of care in packing and slovenly appearance of package; and the last two were the chief causes of the lower prices realized in most cases.

Mr. Dawson, of the Dawson Commission Company, tells me that, taking the average of the season through, poultry brings on the average of two cents per pound less in the local market than it would bring if more care were taken in the dressing and packing. I believe it is not too much to say that from this cause alone the poultry producers of Ontario are losing one-quarter million dollars annually. Practically no more time is needed to do the work of dressing and packing in the right way, and certainly there is no more cost in the hatching and feeding of the chickens, so that this loss represents so much money literally thrown away.

How can the loss due to lack of finishing and improper dressing be avoided? How are supplies to be regulated in accordance with requirements?

The fruit growers of the Niagara District have by their experience given us an answer. A few years ago those growers were in a position somewhat similar to that of the poultry producers of Ontario at the present time. The production of fruits for which Niagara District is famous had not gone beyond the requirements of the market, but a lot of the fruit grown was of indifferent quality, much of it was improperly packed, and there was no proper system of distribution, the consequence being that one town would be flooded on the same day that another would be suffering from a famine. Finally the freight and express rates on fruit were so high that a large part of the profit which legitimately belonged to growers was absorbed by the carrying companies. Because conditions were as stated Niagara fruit men faced the danger of practical destruction of their industry. At this point they decided, as a means of improving the situation, on the application of the co-operative principle. A co-operative association was formed, a central cold storage depot built at St. Catharines, and at that point the fruit of members was collected for distribution. The telephone was also made free use of, in a co-operative way, for the purpose of learning the needs of the various provincial markets. By means of united effort, and central supervision, the system of packing was improved. Car lot shipments were made the rule, and freight charges thus reduced. Not only this, but a case was

presented to the Railway Commission such as could not have been presented by individual growers acting separately, and the rates on pears alone were reduced to the extent of $45 per car on shipments to Montreal. Proportionate reductions were effected on shipments of tender fruits to other points. On the whole, what was accomplished through the commission was equivalent to the difference between profit and loss on the whole industry.

To-day, as the natural consequence of the action taken, the output of the Niagara District is double what it was then, and growers, instead of facing ruin, are growing rich. They are obtaining better returns to-day, pound for pound, with double the output, than they obtained a few years ago with half the volume of production. That is the result of co-operation as applied to the Niagara fruit growing industry.

Let me give you another illustration, taken from our friends the fruit growers. Ontario county is not one of the largest producers of apples; there are a few comparatively large orchards, and a considerable number of rather small ones. Even the largest producers, save where they shipped to the Old Country, up to 1906, seldom averaged $1 a barrel on the trees; the smaller growers did well when they averaged anything over 50 cents. After a number of years a few growers near Oshawa and Whitby formed a small co-operative shipping association. From the 1906 crop some 8,000 barrels were sold through the association, and the average returns for the apples were about $1.60 per barrel. That amount was received clear, less the cost of picking and hauling to the station. One farmer, with an orchard of about three acres, told me the difference between the price he obtained from the co-operative association, and the best returns ever secured from a private buyer, was sufficient to pay the wages of a hired man for the season. In 1907 about double the quantity was shipped, and although the returns are not yet complete, we are assured that they will be better than those of the previous year. So satisfactory has the result of co-operation, applied to apple shipping, proven that those interested in the association propose applying the same system to poultry production as well.

The story told in connection with co-operation as applied to fruit growing is duplicated, but on a much vaster scale, in the history of dairying. I remember quite well a farmer's wife saying that no storekeeper in Ontario would buy Canadian cheese so long as they could get American. At that time each farmer made his own cheese. Now the same article is made in a much larger way in co-operative factories. What has been the result? Not only are we supplying our own home market, but Canada supplies to-day 70 per cent. of the cheese imported into Great Britain.

I have referred to the fact that Denmark supplies Great Britain with one-fifth the eggs imported into the latter counry. The value of Danish eggs exported to England runs into some $7,000,000 a year. How has this enormous trade been built up? In the same way as our own dairy industry—by co-operation. Practically all the eggs sent from Denmark to England are gathered by co-operative societies. Local societies gather for members, and these in turn ship through a central organization. The work is so systematized that practically every egg is fresh and in the few cases in which faulty goods are found the defective ones can be traced to the place of origin. The system of co-operation is applied in Denmark not only to eggs, but to butter making, and in a large part to bacon production as well. This system carrying with it as it does an equable division of the wealth produced, and giving it as it does the fullest possible incentive to each member to produce only the best, has worked wonders in the way of increasing the profits of Danish farmers. Danish butter and bacon brings on the average about $2.50

per long cwt., more than is received on the average for foreign butter and bacon imported by England. Danish eggs command about 2½ cents per dozen more than is received on the average for foreign eggs imported into Great Britain. On these three items Danish farmers receive about $8,000,000 a year more than is received by foreign farmers, on the same volume of products sent to Great Brita'n. We hear sometimes about the advantage that would come to Canadian farmers from securing a preference over foreign exporters in the British market. Denmark has secured a much greater preference than we could hope to obtain by legislation, solely as a result of superiority of product, and this superiority of product is due again almost wholly to the application of the co-operative principle. What all this has meant to Denmark, over a course of years, is seen in the fact that deposits in the savings banks of that country have increased from four to upwards of thirty-seven million pounds in forty years.

But we need scarcely cite the results of experience, either in our fruit or dairy industry, in order to sustain the contention that the co-operative principle is the right one. It is only necessary to cite the experience of Denmark in support of the contention that co-operation is the proper method of handling our poultry industry. When you come to look at the question it seems reasonable to suppose that better results should be obtained by co-operative efforts, particularly in this line, than can be obtained by individual effort. In the first place with co-operation there will be uniformity in breeding. As a result of this again the exchange of superior seed stock will be facilitated and this must tend to improve the general standard of the fowls kept. Co-operators will also be in a position to sell to better advantage than would the members acting as individuals; they will be able to offer considerable quantities of eggs of guaranteed quality, and with the assurance of regularity in delivery. This would enable a co-operative association to eliminate one of the men who stand between the producer and consumer. They could sell direct to the man who stands next to the consumer. Again, in the event of a nearby city market not offering satisfactory returns for the product, shipments could be made to the mining and timber camps of New Ontario or British Columbia. This would be rendered possible because of the volume of shipments sent from an association. Individuals shipping in a small way could not do this. Such an organization might do its own storing and thus be in a position to sell in seasons of scarcity the product of the surplus season.

So much for the egg end of it. In the matter of marketing poultry the advantages are still more obvious. Why is it that the Oshawa Co-operative Apple Shipping Association obtains 60 cents per barrel more than the members had obtained acting as individuals? Because there is now uniformity in grading and packing and selling in large bulk. Uniformity in grading was obtained by taking apples to a central station where they were packed by experts. In applying the co-operative system to poultry products it would be well to adopt the same system. Almost any farmer can raise chickens—there are comparatively few who will either finish or dress properly. For this reason it would be well to have even a central station at which the finishing and slaughtering could take place. It would be absolutely necessary to have a central killing station so as to insure uniformity in dressing and shipments in considerable quantities.

I am convinced that a group of farmers who could guarantee delivery of a certain quantity of absolutely fresh eggs at one point daily would realize at least 5 cents and probably 10 cents per dozen more than they would marketing in the way now common. I know that with uniformity in fatten-

ing and dressing, which would be secured in the same way, together with shipments in large bulk, at least three cents per lb. more could be obtained for chicken than is secured by the average farmer at the present time. With Co-operative Societies all over Ontario as there are in Denmark, the value of our poultry output might easily be made up to ten million dollars a year.

In co-operative cheesemaking lies the foundation of the prosperity of general Ontario agriculture. Co-operation has removed the Niagara fruit growers from the verge of bankruptcy to abounding prosperity. Co-operation has, wherever applied, well nigh doubled the returns of apple growers. Co-operation in a large way has made of Denmark, naturally a poor country, a country of poor soil, and in which the climate conditions are such that there must be eight months feeding in year, a country which within the life of the present generation was bereft of a large part of its territory by disastrous war; co-operation has made of Denmark not only a comparatively rich country, but one in which the riches are more evenly distributed than in any other and in Europe with the possible exception of France.

What co-operation has done in this case it can be made to do, to a proportionate degree, for the poultry industry of Ontario.

The CHAIRMAN: I think Mr. Smith has given us a great deal to think about, especially those of us who are from centres such as Toronto. Undoubtedly the question of co-operation is one that is going to help out the industry to a very large extent. President Creelman was very wise in his remarks about honesty in the industry. I do not suppose poultrymen are peculiar one way or the other in that regard, but if there is one thing more than another in the city of Toronto that damages the poultry industry, it is lack of confidence in the quality of the egg that comes into the city. I am sure it affects me in my own work. You will find eggs sold in Toronto at a price below their value, and I am perfectly certain that the one reason that eggs are sold below their value is due to the lack of confidence in the statement that they are really fresh eggs. Probably most of them are fresh, but that does not do. The one egg in the dozen that is not fresh spoils the other eleven, and they are marked down accordingly. We appreciate very much Mr. Smith's work in regard to co-operation.

Mr. GRAHAM: I would like to ask Mr. Smith a question: Would it be possible to establish a system of co-operation in dairying and eggs? There are cheese factories and creameries. It appears to me it would be a very easy matter to collect eggs daily from farmers. The milk waggon goes up and down the road every day, and there is no reason why they should not draw eggs as well as milk; and when you come to the fattening end of it, it could be done very economically, because in most cheese factories there is an over supply of milk in the months of June and July, and there is a lot of extra labor, which might be used in fattening chickens, and in that way you could give the men employment for a longer period of time. This system is worked in the Province of Alberta, and we have a gentleman with us who is trying to work it in Saskatchewan. There is no doubt the farmers in Ontario are losing from three to five cents a dozen on their eggs. Mr. Baldwin will charge a man five cents a dozen above the highest market price for his eggs and is getting the money, and he cannot get eggs enough. Some of our commission houses will tell you of the annual burial of $10,000 worth of eggs, enough to buy a good farm. These are serious problems, and I would like to know of some scheme to get over them.

Mr. SMITH: Mr. Graham has called my attention to something I was going to say. In Alberta, the creameries are conducted by the Provincial Government, and in connection with these creameries they have gathering

stations for eggs and poultry, which is also handled by the Government. The eggs are sent to Calgary, and from there to British Columbia; and it seems to me that we could, by a little further extension, make our cheese factories, gathering stations for the purpose of handling eggs and poultry products. I think Prof. Graham has under-estimated any stated amount of money that can be got from first class products. Mr. Baldwin gets 5c. a dozen more than the retail price, and the average farmer gets less than the wholesale price and I think the difference is 10c. a dozen.

Prof. GRAHAM: What is the maximum price for eggs?

Mr. BALDWIN: They are selling for 50c. now; last winter I sold them sometimes at 60c. They brought me 55c. for two months, and we were selling for 50c. up to the end of last week.

Prof. GRAHAM: 20c. more than we are getting right here.

Mr. BALDWIN: That is 10c. above the retail quotation. The retail quotation last Saturday was 40c. and I sold at 50c. I have had people offer me 75c. a dozen and a $1 a dozen, for at certain times of the year in Toronto you cannot get enough eggs to supply the demand.

President CREELMAN: Something suggested by Mr. Smith's address impresses me very much, and that was the principle of co-operation. Just as soon as it becomes generally applied it breaks down a lot of local jealousies. Wherever co-operation has been tried it has had a beneficial effect in that regard and the people fall in line and trust their neighbor. This College has been running for thirty-five years, and we have tried to be honest and treat everybody in a fair manner; and yet I was talking to a gentleman to-day about our creamery business and he said things had come under his observation that surprised him. He said one intelligent farmer had remarked to his neighbor that he was going to quit sending any milk into the College factory because Prof. Dean and Mr. Stratton were wearing two or three new hats each year out of the patrons' money. Another patron said they were sending their milk in here because they could not do any better, but they were getting tired of paying Prof. Dean's salary out of their hard earned milk. A third party, a most estimable lady, who was sending good milk to the factory, said she would draw the line at sending milk up there to a Government Institution where the people were all living on Government pap, and where they had ten men to do the work of one. If they believe these things because they do not know any better, you can understand how it is among the rank and file in the back townships.

Why should not 20 farmers meet together and say, we will appoint John Smith and pay him a commission, if necessary, to collect our eggs and sort them himself and ship the eggs to the market and build up a reputation for eggs from our neighborhood. It seems so reasonable that reasonable people should get together and trust one another. I often think of that little country of Denmark, with a lot of poor land in it, sending into Great Britain millions of dollars' worth of stuff, and here in Ontario we have millions of acres and we are only sending in coppers' worth, because to a very great extent, of these local jealousies, which prevent us from introducing just these methods of co-operation. We use the same blacksmith and the same shoe-maker, we do not have a dozen of them in the same neighborhood, and we do not find the merchants cutting each other's throats, and yet when it comes to disposing of the stuff which we have worked at early and late, we think we are perfectly capable of handling our own business. We put it up in ugly packages, and ship it off, when we might pick out one fellow and say to him, "We will make it worth your while to attend to this business." I certainly think that by co-operation we would save more time and money when the end of the year came round.

A MEMBER: A buttermaker from one of our creameries came here last fall, and I asked him what he was paying per pound for fat, and when he told me I did not see how he could do it, and when I questioned him I found out that they were gathering eggs and poultry, and in that way they were making enough to pay the cost of hauling cream.

Mr. McDONALD: The Government of Alberta gave the farmers the market price for their poultry, 10c. a pound, and when they sold them they averaged about 19c. a pound. They made an advance to the farmers of 10c. a pound, and then the Government fattened them, and they were able to pay the farmers 7c. more. The egg gathering system did not work very well; it was always thought to be too much bother collecting the eggs. The country is very rough, and a great number of eggs are broken. If you start that business here you might not have any cheese or buttermakers after awhile. I think it should be a business by itself.

Mr. CREELMAN: The difference received from these birds in Alberta was the difference in the market price for the fancy article and the ordinary chick as put on the market?

Mr. McDONALD: Yes; we will be able to get all kinds of chickens out there next year.

Q.—How is the average poultry placed on the market in such towns as Calgary, Medicine Hat and Indian Head?

A.—In a pretty rough state.

Q.—Would there be a chance to ship any Ontario poultry?

A.—Yes.

Q.—Do you think there is any Ontario poultry shipped west?

A.—I do not know.

Mr. CURTISS, Ransomville, N.Y.: I remember one instance when we had so many ducks on hand that we could not get a price, and the Hotel Iroquois, in Buffalo, offered us 10c. a pound, and as we could not get any more we let them have them; and they put them in cold storage till they used them. The next year they came after more ducks but they could not get them for 10c. a pound, and they paid us as high as 26c. a pound then; they were bound to have our ducks. That is the way we built up our trade in Western New York. We have a trade in Buffalo, Niagara Falls; and other large centres, such as Rochester and Syracuse, and have over 100 customers. We send ducks as far as the city of Cleveland, and the leading hotels in Cleveland are using our ducks and paying us 25c. a pound when they could buy ducks on the local market for 14c. If you have the article in proper condition you will get the money for it.

Q.—How many ducks do you raise in the year?

A.—40,000. Ducks are our strong hold, although we raise quite a number of chickens. We have 64 acres of land. Our feed bill last year was in the neighborhood of $20,000. Our farm is just for our birds; it is practically all in poultry. We have 24 acres in which we grow green feed, and sometimes we get out and buy a field of hay and cut it green and draw it in and feed it to the ducks.

Mr. NIX: The farmers do not realize the possibility of poultry as an adjunct to their business, and they lose a lot of money by not marketing their poultry in the proper shape. Successful fruit growers now spend a little money in ribbons to decorate their packages, and they bring them in dollars of profits.

HOW WE RAISE 30,000 DUCKS ANNUALLY AT A PROFIT.

By W. R. Curtiss, Ransomville, N.Y.

In growing ducks there are a good many things that we do not do the same as we do with chickens, and there are some things that we do the same. It is harder manual work to grow ducks than chickens, and you have got to use a lot of judgment.

In the first place, I will explain how to get the stock. If you get weak stock it will show up for a number of years, and we have to be very particular about this. Therefore, I will go back to the ducks that lay the eggs that produce the ducks that lay the eggs that the ducks are hatched from, and we can go back farther than that with good results. You cannot go back too far. We will suppose that the ducks that lay these eggs are good strong healthy ducks. We set the eggs in a machine, and we put them in the brooding house, and brood them the same as we do the ducks for market, until they are eight weeks old, and that is the time when we fatten ducks for the market. Before these ducks are fattened, we sort out our breeding stock, at the age when the ducks are old enough so that we can tell the sexes. I go through a large number of ducks, and perhaps I might get five or ten fit to breed from out of a large block of 100. That seems like a lot of work. Every time you change the feed the ducks won't eat, and if you change gradually they will probably be off their feed for two days; and just at this time we sort out the breeding stock, and it is just at the time we change the feed, so that we do not lose anything. I sort these ducks personally, because I believe it is the foundation of the whole duck business. We handle the ducks by the neck; we never take them up by the legs. We hold the duck up and look at him, and if he has a good broad breast all the way through, and fairly deep keel, and broad back, and not too long a neck, and his head not too long, and if he fights a great deal and tries to get away, showing he is strong, then we will pick out that duck. He has got to be a certain weight: we do not actually weigh them, because that is too much trouble. In handling so many ducks we get so that we can tell the weight of a duck very closely; we can guess within a quarter of a pound of the weight, and we can tell almost the minute we pick up a duck whether it is one we want or not. They are then put over into pens by themselves and after we get them picked out we drive them about half a mile to a field where we pasture them for the summer.

We pick the breeding stock out in May. You can take them out in April or March; but with us the price of ducks is considerably higher in March and April than it is in May, and when you are marketing 4,000 ducks a week, the lowering in price of two cents a pound is quite an item. But as long as we can get as good results from the May hatching of ducks we see no object in getting earlier ducks.

We take the ducks out in May, and they are taken out in flocks of 200. We start and drive these ducks over to the pasture, and in driving them we will say we have 210 or 215. We keep them in a large wood lot. We take lots of time driving them along, not too slow, and not so slow as you would drive market ducks. We keep them moving, and when we get them half way over, there are two or three of them will break down, and flags their wings, and they cannot walk. These ducks are left right where they are. It is simply the survival of the fittest, and when we get to the breeding pens there will be ducks strung all the way along where we have been driving them. It is only the ducks who have strength enough to walk this distance, being urged

all the time, that are put in the pen. Then we go back and clean up the ones that are left and they are put into the marketing pen. It does not matter how nice a duck they are, because it is strength we are after.

We put from 100 to 200 ducks in a pen, and there is no shed or anything for them to run under. It is just simply a wood lot. It would be just as well to have them run in a field, provided they had some artificial shade, but decidedly you have got to have some shade for ducks. If you put ducks in a hot field in the summer time there is danger. I have seen full-grown ducks get sunstruck and lie down and die.

We feed them there for five months on light food. We do not want to fatten them. If there are any ducks get off their feed they are taken right off; they are not kept. We keep a lantern burning in the trees on dark nights to keep them from getting scared.

A peculiar thing about ducks is that they will run and trample on each other and jump in the corner of the pens if they get scared on a dark night. If it is a bright moonlight night we do not light the lanterns. We wish we had electricity, so that we could have electric lights in each pen.

The feed for these ducks is four parts bran to one part of flour and one part cornmeal and 1-20 beef scrap. For green feed we use four parts clover. The clover should be about one-third or a little more than one-third of the entire feed. You can feed them all the green feed they will eat. A good indication is to watch their troughs, and after they have eaten their feed if they leave a little clover in the trough you know they are getting all they want, and may be a little more; and if they clean this trough up they haven't quite enough to eat. If they have too much to eat, they pick the green feed out and leave nothing but the mash, and then you know they haven't enough green feed. We feed them wet mash; mix it a little more moist than you do for chickens. These ducks must not be fed all they will eat, because if you do, they will get in good condition. You must only feed them what they will clean up, and if they do not, you must go through and clean it up. They are not to be starved, but you must keep them just a little hungry, and they will go out in this one or two acres of land and eat more or less green feed, and they will run up and down the pen and it will give them muscle.

If you take one of these ducks, and one of them market ducks, you will notice all the difference in the world between them. The market ducks are just like a chunk of lead, and the breeding duck will flap and flutter and hit you on the arm with his wings, and sometimes hurt you.

The reason why we feed them in this manner is to get strength. We keep oyster shell before them all the time. We do not use any harp grit for ducks, because it does not give us good results. We would rather have the smooth grit, and we go to the lake and to the sand pit and get the gravel; about the size of wheat is the right size. We keep plenty of it before them and there is no necessity to give them oyster shell at this time that I know of.

We keep them in this manner until they are five months old, and then we change and put them in permanent quarters. Most any kind of a building will do for a duck house. It does not require very much light, but if you want eggs all the winter you must have it warm enough so that the eggs won't get chilled. If you go through pretty often and take up the eggs they will not get chilled. You must not let them out, because they will lay on the snow bank if you do.

We do not have any nests in our duck houses; we simply bed them with shavings. We did try nests, but we could not see any great benefit from

them. They will dig a hole in the corner and lay the egg and cover it up and when you go through in the morning you have to be careful that you do not walk on the eggs. We have a short stick and dig in these little holes and get the eggs out. Sometimes you will find a dozen eggs in one hole, six inches below the top of the ground. A good house for this climate would be such a house as I spoke of for hens, except that you would not want to have so much light. In our country we do not have very much snow, and we do not have any shed; they simply run out the year round. If it thaws a little they enjoy it, just as much as they do the rain storm; but I would judge that in this country you need a shed as you have so much snow. I would not keep them from going out of doors if they wanted to. If you let a hen have liberty the fertility of the eggs will be so much higher, and if you keep ducks confined you will find that the fertility of the eggs won't compare with the eggs if they are let out. The laying houses should be about five square feet to each duck. There is no particular arrangement; just simply, if you have more than one pen in the yard the fences should be about two feet or two and a half feet high.

We clean out our duck houses only twice a year. As the bedding gets wet, we keep adding to it, put on enough to cover up the moist bedding, and we think this thickness underneath has a tendency to keep them warm. We cannot see any injurious effects from it, and it saves us a lot of work.

If the ducks are hatched out in May, they are put in here about the first of October, and they should be sorted again at this time, and if there are any that are defective, especially if they have a narrow breast, we put them out. We want broad, flat breast clear through to the keel and as broad as you can get them across the back.

Q.—You want a short-bodied duck with a short neck?

A.—We do not want the body too long or too short; we have what we call a medium. If you get the body too long you will get a spiked duck.

Q.—How much would these breeding ducks weigh?

A.—They weigh over standard weight; we pick out a good sized duck; we do not take the small duck, although some markets call for a small duck. The last two or three years we kept a few pens of small ducks for special customers, but we have got these fellows educated up to a large duck now, and I have cut these out.

It is the same in ducks as in chickens. You are growing meat; and if you can grow an extra pound it just means that much more profit, and the larger the duck, the more money you make.

We sort out a good sized duck, and we have never had one too large so that it would not breed. We breed from a pullett, we never breed from a yearling duck. A duck will take on fat very easily, and if you keep them over the second year they get too fat, and they will not lay as early, and the eggs are not fertile, and we cannot get good results. We always sell them off; we never keep an old duck unless somebody wants to exhibit them. Some people want a large heavy duck to exhibit, but when you take that duck home and try to breed from it, the eggs will not hatch, and then they blame the man from whom they bought the duck; and if you ship them a duck in breeding condition, then they will blame you for not sending them a fat duck.

We feed these ducks on a light feed. We simply have a pail of water in the pen, but it is a great deal larger than the pail we use for hens. It is small at the bottom and flares out at the top so that the most of the

water is in the top of the pail. We set it in the top of the bedding so that they will not tip it over. If you have any trouble with the pail tipping over, drive two or three stakes around it.

We run the ducks in flocks of twenty to twenty-five. In the winter time we have one house where we run four flocks of forty in the pen, another house where we run sixteen flocks of twenty in the pen, and we can see no difference in the way these ducks lay, or in the fertility of the eggs. It is simply a matter of convenience, and I believe I can run a flock of ducks at one hundred in a pen.

When you go to feed ducks they will all pile up, and that is one reason why we keep them penned off in the winter time. As soon as the spring comes we take these pens down and let them run in a flock, and we have as high as 300 in a flock running over a three or four acre field of rye. At night they have to be kept in, and each flock knows its own stall, and if they do not we drive them, and we find it is easier than having so many yards or gates to open.

Q.—How many ducks do you mate with a drake?

A.—We mate one drake and five ducks. We start these in October, and as the season advances, say about the first of March, we watch the ducks, and if we see two drakes getting to fighting, we catch one of them; we catch the poorest and put him in a pen by himself. Whenever we see any fighting, we take out a drake, and when there is no fighting, we leave them alone, and they balance themselves up. Sometimes you will find they will run for a long time and there will be no fighting; then, there will come a rain storm, and there will be puddles of water in the yard, and if you go out you will find dozens of them fighting, and they will tear each other to pieces. They will get the blood started and your five drakes will get after one and fairly eat him. I have seen it when we would not have more than one drake to ten or twelve ducks, and we would get just as good eggs as we got in the winter.

Q.—How many hens do you mate in the Wyandottes to the male?

A.—I expect to have about twenty this year. We use cock birds to mate with the pullets, and an old cock bird to mate with the old hens. We have never tried it the other way, and we cannot see any very great difference. Some years ago we had six and seven ducks to one drake, and I do not know that I have seen any difference.

Early in the season we like to get as many fertile eggs as possible. The market for ducks is high at the start, and when it starts to drop it drops with a crash, and if you can get ahead of the other fellow it means a few thousand dollars profit.

Q.—What fertility would you get at Christmas time?

A.—Very low fertility. These ducks put up in October start to lay in six weeks, and if you start that feed you ought to let them run two weeks before you start to take the eggs for hatching. If you get 10 per cent. fertile eggs you are doing fairly well; the next week you will get 20 per cent., and they will generally jump up 10 per cent. a week until you get up to 90 per cent. At present our eggs are running 75 to 76 per cent. fertile, and we are getting 300 to 400 eggs per day. This laying feed is just the same for ducks as it is for the laying hens. We use the same mash; it is equal parts of corn-meal and bran, and two parts of low grade flour; or four parts of cornmeal, four parts bran, and two of low grade flour. We do not use any middlings at all, we never do. The reason why we do not use middlings is because we want something that will hang together. A duck or hen likes to take hold of something that will hang together, and the

flour will make it ball up, and when you throw up a shovelful on the pile it will hang together. We put a little more clover in this. We put in five parts of cut clover. You must have bulk to fill these ducks up, and I do not know of anything that will take the place of clover for ducks. I have tried cabbages and vegetables, and while they are good in their place, still there is not anything we can get the quality of eggs on that we can get on clover hay. Alfalfa is good, but we do not like it as well as we do clover.

Q.—You do not feed any boiled turnips or mangels?

A.—No.

Q.—Do you use clover hay as a filler in place of cooked vegetables?

A.—Yes. Sometimes we have a surplus of vegetables or potatoes on the farm, but when we want lots of eggs, we feed clover hay. There is one peculiarity in ducks: When they are laying in good shape and everything moving off as nice as can be, you may have a nice field of green feed in the spring and think you will make these ducks hustle; but if you feed them that green feed you will knock them out entirely, and you will get but very few eggs. These ducks that are put in the pens for breeding are fed on clover hay right straight through the season. We dare not change that feed; if we do we stop the egg supply.

Q.—Do you feed that clover dry?

A.—No, we scald it with hot water. We mix the feed in a mixing box. The box is about two feet wide and one foot deep, and this box stands up from the ground about one foot; we put the dry feed in there, we put the bran on the bottom, and then we put in the flour. That is a sticky feed, and we have to get it in between. If you put it on the top, then when you put the water on, you will have a paste, and therefore, we put the flour in second and the cornmeal on top. Each layer is spread out evenly, and after the cornmeal we put on cut clover. The beef scrap is put in a pail and soaked before it is mixed with the other feed. We have never tried feeding cut meat to the ducks, but they do well on beef scrap.

Q.—Whose beef scrap do you use?

A.—We find that we get the best results from Armour's. We use Darling's sometimes, but we do not like it as well, and we use some beef scrap that is made in Dayton, Ohio. We use about ten per cent. of beef scrap for the laying ducks. It should be soaked the night before. We put it in a pail of water and leave it there to soak.

Q.—Does it absorb much water?

A.—Yes, half a pail of scrap will make three-quarters of a pail. Some scrap you can soak in warm water, and some you cannot. We generally use cold water. We turn this beef scrap on the clover before we put the hot water on the clover, so as to warm up the beef scrap. We do not want it hot or cold, but we want it warm. We put it on top of the clover and stir it all up and let it stand for about fifteen minutes. Then we take this tub and turn it over on top of the ground grain food, and then we take a shovel and shovel the feed into the end of the box where we have left an open space. Then we throw it into the other end, and every time we do this we turn it over.

Q.—The same as you would mix cement?

A.—Yes. Then we take a six-pronged pitch fork, being careful to work it back and forward. For laying ducks, you must be very careful in mixing the food, and we go through it again and mix it again. We are working now on a power mixer.

We do not use the first eggs for hatching.

Q.—Is there any market for these eggs?

A.—Yes, a good market. A certain class of people prefer them to hens eggs. We could get almost any price for them about Easter time. We ship all the infertile eggs to Buffalo, and about Easter time they will bring as much as if they were fresh eggs. We have had as high as from 45c to 50c a dozen. We set the machine in December, and we generally have a hatch by the 15 of January. The first of February is the time the duck season opens. The dirty eggs have to be washed; that is absolutely necessary because it makes the machine so filthy. We take a pail of eggs and pour on water; it must not be hot water or cold water, but just about luke warm. We do not wash them any more than we can help, but just simply take off the dirt, because we do not want to take off the film that is on the egg. If an egg has only a few specks on it, we never bother with it. It is only the really dirty eggs that we wash.

I do not run the incubators myself, but I will give you as near as possible the way they are run. First, we sterilize the machine, just using common salt and water to wash it out, and then heat it up to about 100 degrees, puting the eggs in the trays on the top of the machine. We set every Monday and Thursday. The oftener duck eggs are set the higher the fertility, and if it was possible to set them every day we would get from two to three per cent. more fertility. We lay a thermometer on the bottom of the tray, and make it go to 100 degrees. If we take a hatch out on Monday, that machine is cleaned out and the doors opened up, and the lamp blown out, and it is given a rest until the next Thursday. We never set it on the same day. We think it is a good thing to let the machine cool off.

We have the machine heated up to 100°, and the eggs on the top of the machine, and there is a little heat from the top of the machine goes into the eggs to warm them. Then we put them in about Monday afternoon, and watch them until about 10 o'clock at night. We leave them until the morning, and then the machine will be about 102°, and if it is not we put it as near to 102° as we can get it. We let it run 102 or 102½, or 103°. We do not like to see it get above 102° for the week, but after the first week we let it go up to 103°, and let it run along at 103° for the next two weeks; and the last week it goes up to 103½ or 104°, until it starts to hatch. During the hatching time we do not like to see it less than 104°. After it runs to 105° we never bother with the heat. We turn the eggs with a flop tray; we can turn more eggs in that way than you can by hand.

Q.—You have two trays exactly the same size, and you put one over the other and flop them over?

A.—Yes. We do not start to turn for four days after the eggs are put in the machine; we never touch them from Monday till Thursday. Duck eggs will start to hatch in forty-eight hours before they come out of the shell, and we stop turning them then.

Q.—How much cooling do you give?

A.—It depends on the warmth of the machine; if the machine is put to 104°, that is a degree too high. It has got to be cooled right off, and eggs are yanked right out of the machine, and set on top and cooled. A good many times we leave the door open, especially towards the last of the hatch, and sometimes we put the eggs on top of the machine. You have to use judgment in cooling duck-eggs. If you have the machine full of live germs, and the heat strong in that machine, you have got to cool in order to keep your heat down.

Q.—Do you think it would be an advantage if you had a machine that would fluctuate with the heat?

A.—I do not know. We always change the trays from side to side and from end to end. There is no incubator exactly the same in all parts of it, and we change the eggs around in this way.

Q.—You say you do not turn for the first four days. Have you made comparative results between incubators where you do not turn and where you do turn?

A.—Yes.

Q.—What is the difference?

A.—We do not see any difference; just simply a saving of time. We cannot see any better hatches or stronger ducks.

Q.—What about the moisture and air in a duck incubator?

A.—We do not believe there is an incubator that is made up that gives us enough air for duck eggs. We get exceptionally good results now. The reason I have for saying this is, we can take the machine and fill it with duck eggs, and then test it, and only leave the fertile eggs in the machine, and we will get better hatches than if we test it out and fill in with eggs from another machine.

Q.—Do you keep water in the bottom of the incubator?

A.—We do when we use a sand-tray machine. With the other machine with moisture overhead we do not put any moisture in. It is very important that you use moisture in hatching duck eggs. You simply cannot hatch them unless you do, and you must have large quantities. When we start to turn we use moisture on these eggs. Some people use water to sprinkle them, others use an atomizer and others use a cotton cloth. I do not know that it makes any particular difference how you put it on, as long as you do not put it on in too large quantities. You want a large quantity in a sort of a tray and not too heavy, in fact we fairly soak the eggs with moisture and I think the cotton cloth is as good a way as any. Take it and wring it out in warm water and put it on the eggs and let it set on there for fifteen minutes and then take it off. We go along about noon and put the moisture on them.

Q.—What temperature of water?

A.—We use warm water; we just use our hands to get the temperature.

Q.—Are these cloths put on while the eggs are inside the machine or outside?

A.—The tray is pulled out and the cloth wrung out in warm water, and then we shut it up and let it steam.

Q.—How long do you leave it in there?

A.—About fifteen minutes. Some people leave it in until the cloth is dry.

Q.—Is there any water in the machine?

A.—No water in the machine. We use moisture on them right up until they start to hatch, and sometimes we put it on when they are chipped. The moisture will drop the temperature in the machine two to three degrees.

Q.—How often do you apply this moisture?

A.—About once a day. That is what they call the Moss system. There is a man in the United States that sold this method to twenty duck firms for $1,000 a piece. Duck men are very suspicious and jealous, and you can scarcely get a duck man in the United States to tell you anything about the duck business. We do not feel that way.

When they start to hatch out they will chip a small hole in the egg, but they won't come out right away: they won't come out for twenty-four hours. We never worry about the duck getting out of the shell, but you can help a duck out of the shell and make it live, and we believe it is feasible

to help these ducks out of the shell if necessary. We never open the machine when they are hatching or unless it gets too hot, or some ducks get into trouble. If there is an egg in the machine that has a chip as large as a quarter we help the duck out, but the minute you see blood start then you know the duck is not far enough; if you do not see any blood start pull the membrane off so that you can pull the head out and just set him back there and he will get out the other part himself. Sometimes we take twenty to twenty-five ducks to a machine out in this way. As soon as the ducks are dry we take them off into the incubator house.

Q.—About what per cent. of fertile eggs do you hatch?

A.—Our average is around 75 per cent.; that is for the season. We had a hatch in December. From the early eggs we had 58 fertile eggs in the machine; and we got 53 ducklings, and didn't have to help one of them out. That is proof that we do not have enough air in the machine when it is filled with eggs. Moisture has a great deal to do with the development of the ducks and their getting out of the shell. If you haven't moisture there will be a great many that will chip and stick there, and you will have a great many that do not get out at all. This moisture method is known all over the United States now. Mr. Nix has got it in his catalogue, but ten years ago nobody knew it. We used to take the ducks out of the incubator and take them over to the brooder house, and inside of two or three days lose half of them. I knew there was something wrong, and I meant to find out what it was; but before we got hold of this moisture method we got a hot water incubator. We got the machine from Bristol, Conn., and the first time we set it we only got two ducks and then three or four, and we abandoned it and left it lying in the cellar. One day I went at it and took an auger and bored a lot of holes in the bottom and in the side and ran tubes to the centre of the machine, and then I put three or four shallow tins, filled with water, and I ran that machine and I got splendid hatches and the ducks would live better than the others. That is how I got on to the moisture method. As I told you I do not hatch the eggs, but I look after the brooding, and the brooding of ducks is a very difficult piece of work unless you understand it. You will have trouble and you won't know what the trouble is. I have spent a good many anxious days and nights over this problem.

I cannot see any use for an individual brooder for ducks; although I have raised them in individual brooders with good success. There is no use putting a fringe in front of the hover for the ducks; they do not get enough air. In building a hover for ducks we use the individual pipe system,—two flows and two returns, and we partition them off just whatever width we want it. I think about four feet is the best. The pipes run over the tops of the partitions; they are six inches high. There is a partition inside of the hover, and there is a door that comes down below the pipe leaving an opening of about four inches that the ducks can run under. This pipe helps to hold the heat so that it does not escape from the pipes until it is radiated down on the ducks, and the ducks get the ventilation from this lower space. We have no ventilation in the top; if we want to ventilate, we simply open the door. We use the top of this as a walk on which to get around and pour water into the cans. We keep the brooder-house heated up to ninety degrees as near as we can get it.

Q.—Where do you place the thermometer?

A.—2½ inches from the bottom of the hover. The pen is four feet wide and the hover is about 16 to 18 inches wide. We have a short brooder-house, only fifty feet long. We handle the ducks differently in the winter

time to what we do in the summer. We do not put over fifty ducks in the pen in the winter time. These ducks are put in there the first day they are taken off, probably about noon, and we do not feed them at all on that day. We just simply let them stay in there, but we put in a couple of water fountains where they can get a drink, and a good many of them go out and get a drink. If a duck gets water, it sets him on his feet. We go along at nights and raise up the covers and air the ducks; and if there are any weakly ones that do not seem to know enough to go out and get a drink, we stick their noses right in the water and make them drink. After you have done that two or three times they will know where the water is. The first thing next morning these ducks are fed on a board right in front of the hover, and the food we give them is four parts bran, one part cornmeal, one part flour, one part rolled oats, a half part beef scrap, and no green feed whatever. You must not use very much beef scrap at the start, because it is liable to physic the little fellows. Oatmeal middlings is as good as anything so long as you get the oats ground up. We have used grit in the food, but we never see any particular benefit. We sprinkle a little fine sand in the food: it must be clean sand. We like to get sand from the lake, about the size of granulated sugar. This food should be mixed very crumbly and not too sticky. We feed this on boards, and let it stay right there in front of them. We do not scrape it up at all for the first day or two, and the ducks can go up and eat when they get ready. If they clean it up, we give them a little more. We keep it in front of them the first day. If the first day is a stormy one and cold we do not put these ducks out, but if the sun comes out, just the minute we see that sun, we go right for the ducks and get them out. We drive them out if they won't go out, and if they are not strong enough to walk we carry them out, and you will be surprised to see how the little fellows like it. They will go out and sit down and stick their noses in the snow, and eat a little. The middle of the day is the best time, get them into the sun if you can. We generally have from fifteen hundred to two thousand in a hatch, and you can take care of these just as well as you can one pen. You must have good men for this work; you cannot leave it to anybody. You must have a man who has a natural love for it, and who would not see one of these little ducks suffer. I am very fortunate in this regard. I have a brother-in-law who takes a great interest in our work there. He takes, in fact, more interest than I do in the brooder-house, and he just lives in the brooder-house. He is having the best success we have ever had. The minute he sees one of the little fellows that cannot stand up he will go and take him in his hand. Maybe he will have half a dozen in his hand and he will travel back and forth half a dozen times with these little weak ones, and you can bring these weakly fellows through, if you treat them in that way. As soon as they commence to get cold, some of them will know enough to go back in the hover, and others you will have to carry back. We do not put a hole in the centre of the brooder-house; we put it in the corner, because it is easier to put them in if you have a hole in the corner. The second day most of them will go out themselves and at the end of the week, we have them all running in and out. The first two days, we run the brooder at ninety degrees, then we drop to eighty-five and then we run it at that until they are a week old, when we drop it to eighty degrees.

There is a peculiar thing about ducks piling up. If a flock of chickens pile up, you will find that the ones underneath are dead, but take a flock of ducks that will pile up two or three deep and when you stir them up, there will not be any dead. The duck on the bottom seems to get as much

air as the duck on the top. They are fed the same feed for the first ten days, and at the end of ten days they are moved into another house where the heat runs about eighty and sometimes gets to seventy-five degrees. The duck is a very rapid grower, and it must have a large amount of fresh air. If the heat is kept too high, and they are not let out doors, they will go off their feed. The ducks should not have any hover after they are three weeks old. In the summer time, they should not be in the hover for over two weeks. Foul air and too much heat will throw the ducks off their legs so quick. If you see a duck get lazy, you can make up your mind you are getting close to leg weakness, and you have got the cut your heat off; if you do not you are going to have a lot of trouble.

Q.—How do you regulate the heat?

A.—Hot-water heater, very similar to the one that Mr. Nix has here with the expansion tank, and it works admirably. We can hold the heat very well with that—within four or five degrees—and that is close enough for ducks. At night it ought to be set five degrees higher than you would want it in the morning. It will generally drop five degrees in the night. I always make a round of the place at one or two o'clock in the morning to see that the ducks are all right. This is hard work to do, but I cannot get along without it. I have done that for the last four or five years, and a good many times I find a lamp smoking, or a rat had got into the pen, or something had happened, and it saves me a lot of expense and trouble. After they are ten days old, we drive them into another house built with hot-water pipes running through the centre, and we use this walk on top of the pipes to go back and forth to clean out the house. We clean the brooder-house out every ten days. The pipes are eight inches off the floor, and we bed up under the pipes to within about three inches of the last pipe, and then we have this sloping, and as it comes towards the entrance it gets wider and a duck can go in here, and if it does not suit him, he can go farther back until he comes up within three inches of the pipe. They dirty the pens up quickly, and we go through and rake off about one inch and the water can sets outside, we take the wet litter from under the can and throw it out and then we rake this dry litter in its place. When they are a week old, there is just enough on the floor for the ducks' bedding. When we put them in the other house, we give them another feed. We cut out the rolled oats and we feed three of bran, one of cornmeal, one of flour, and half of beef scrap, and two-and-a-half of green feed. We increase the beef scrap a little and increase the cornmeal a little. If you feed ducks too much cornmeal at the start it will kill them off. This cornmeal gets musty, and the feed will stay in their crops. It has got to be wholesome and clean, and the beef scrap has got to be as near the pure article as you can get it. Sometimes we take the beef scrap and go over it and take out the finest particles. There is a beef scrap called Spratt's Patent. It is a high price, but we find it suits us.

After they stay in the house four weeks they do not get any more heat. We cut the heat off a good many times before they leave the house. Of course, in the winter time we keep them in the house until they are five or six weeks old. In the winter time we feed clover hay, and in the summer time we feed cut rye and clover. You must cut it very fine for the little fellows. The nicest thing is green clover or lawn clippings. We feed the ducks four times a day: At 5 o'clock in the morning, 9 o'clock in the forenoon, 1 o'clock in the afternoon, and 5 o'clock in the afternoon. They are supposed to take an hour's time to feed. We do not shut the ducks up; we let them stay out until it is dark, and then we drive them in. We like to

keep them out doors as much as possible. I had one house that I built last summer, and just as soon as it got warm weather the ducks commenced to go off their legs. They were five weeks old. I never had that trouble before with ducks that age, and I made up my mind that they wanted more air; so I went over the house and we cut the peak of the roof right out, and put a hood over it, and left an opening of about a foot, and inside of five days we did not have any more leg weakness.

Q.—Do your ducks have water to swim in?

A.—The breeding ducks have water to swim in. We cannot see any difference in the fertility of the eggs, but they look nicer.

Q.—Would it be any advantage to have a creek?

A.—If I was going to locate I would have a creek, and I would build pens along side of the creek so that I would not have to carry the water to the ducks. You can lengthen out the laying season by manipulating the feed. We have been able to lengthen out the laying season about six weeks. We heard a lot about feeding fish down at Long Island. I wrote to them about it and they said that if they fed fish to laying ducks we could extend the season about a month longer, and this present season I propose to give it a trial. I have seen Long Island ducks sold for 20 cents a pound in November and December, when in October they were selling for 15 cents. This year we have raised 1,000 ducks that we have in the pens now feeding for the market. We have been dressing them quite a long while. Of course, it costs more money to start them laying in the fall. The Hotel Statler has just been opened in Buffalo, and the steward asked me if I had anything nice for a banquet, and I told him our spring ducks, weighing two and a half pounds, would be a nice thing, and they could give one to each person. I told him I would not kill them at that age unless I got my money, and I would not sell them unless I got 25 cents a pound, and he wrote right back and told me to send him twenty-four. The next week I got a letter asking me to send him up 36, and the next week I got another order for 36. And he has been ordering them right along, and is paying 25 cents a pound for them.

Q.—Do you have any trouble with soft bill in the winter?

A.—No.

Q.—What is the cause of that?

A.—If you can take a duck, and never let it out doors its bill will get soft. The only way to cure it is to get them out of doors. I know one man that lost thousands and thousands of ducks this last year from soft bills, and he has gone out of the business this year on that account. We change the feed when they are put in this cold brooder. You must change the feed gradually.

Q.—What effect has it on ducks if you allow visitors to tramp over their yards?

A.—I do not think it does any harm to take the people around a little, especially if they do not get too close to them.

Q.—Will you cut the beef scrap out when you use the fish?

A.—Yes, I will use the same proportion of fish. We always feed the ducks out doors. They should never be fed inside. Of course, if the weather is very bad, and the ducks do not care about going out doors, then you have to feed them inside. In the cold brooder we have to be careful, because if a thunder storm comes up very suddenly the ducks will stand right there in the open. They throw their heads up, and they will not know enough to go into the house, but if the rain comes on gradually they will go in, but they seem thunderstruck if a storm comes on suddenly.

Just the minute they hear a clap of thunder that is the roll-call for every man on the place to get to the brooder-house and get these ducks in, and many a time I have had to get up in the middle of the night when I have heard thunder and look at the ducks to see that they were not outside. Sometimes we have hired help that are a little grouty about getting up in the night, but the sooner you get rid of these fellows the better. Ducks that are just hatched are put in 4 foot pens, two weeks old they are 6 feet wide, and from 24 to 48 feet long; and then when we move them into the cold brooder the pens are 8 feet wide and 100 feet long. We have to widen the pens as the ducks grow. You would be surprised to see how they take on flesh. We never put over 100 ducks in a pen, and if we had the room we would not put over 50. The fattening pens are 24 feet wide and 100 feet long, and we have a wooden railway that runs down between the pen and runs up into our grain elevator. Our grain comes in by the carload, and is unloaded at the elevator, and the mixing room is just off from the feed room. The feed is a big item. We spend $20,000 a year for feed.

What we call out growing feed is: We give them three of bran, three of cornmeal, two of flour, and one of beef scrap, and one-third green feed. A lot depends upon how the green feed is prepared. If it is cut up one or two inches long they won't eat it as well as if it was cut fine. We use an Ohio cutting box. It was made for cutting tobacco stems. We manufacture cut clover and hay and sell large quantities of it. We do not give any soup to the ducks that we are going to use for breeding purposes. We feed that to the ducks we are fattening.

Q.—What is the name of the firm that manufacture that cutting box?

A.—The Silver Manufacuring Company, of Salem, Ohio. We got a special attachment put on the machine in order to cut the green feed as fine as possible.

Q.—Do you ever use rape?

A.—Yes, we like it all right, but it is hard work to grow it in our country.

Q.—What time of the year did you try to grow it?

A.—In the spring. If you can get sweet corn they like it.

Q.—Did you ever try ensilage?

A.—No, but I have known where it has been tried and proved successful, and I propose to put up a silo myself next year.

After three weeks we change their feed, and we give them four parts of cornmeal and one part of bran, and two parts flour and one part pork scrap or soup. It is important to give them either pork scrap or soup if you want to fatten them.

Q.—How much green food?

A.—We do not feed very much green food at this time, it all depends on the market. You can have white skin ducks or yellow skin ducks just as you feed them. The markets over here demand a yellow duck.

Q.—How do you make the white ducks?

A.—By keeping the green feed out when you are fattening them. All you have to do in order to get ducks the year round is to use the same ration I have given you here. And you can make them lay just whenever you want to. I went to see an old Irishman one time who was running a duck farm. He was sort of a grouty fellow, and they told me I could not get on the plant. I got there and got acquainted with him, and he took a liking to me and asked me into dinner. He showed me everything he had on the plant. I gave him plenty of questions, but he did not answer them very well. He had to drive me to the depot, and going along in the rig I got

questioning him all the time. Finally he said: "Look here, Curtiss; I take quite an interest in you, and I would like to have you succeed, and I will tell you just one thing and you follow it out, and you will succeed." He said: "You take a piece of paper of any size, and you just write on that piece of paper 'Fresh Air,' and put that in the top of your hat, and when you get home, if you are going through the duck house and you find something the matter with the ducks, and they are getting off their legs, and are weak and you worry about it, after you have tried everything else that you can think of simply take off your hat, and there is the trouble." (Applause.)

The CHAIRMAN: I must congratulate the members of the Institute for the opportunity they have had this morning, and at the same time to congratulate Mr. Curtiss for the very full and very illustrative explanation he has given. It has certainly been a treat to hear him, and it is one of the best things we have had at our Institute meeting. I certainly congratulate both the Institute and Mr. Curtiss upon his ability to present the case as he has done.

A CHALK TALK ON BREED TYPES.

By FRANKLANE L. SEWELL, BUCHANAN, MICH.

I have been asked to make a few lines this afternoon. I have often found myself confused in the order in which to classify the different types of poultry, and I have made some little sketches, commencing first of all with the original jungle fowl, the *Gallas Banciva*, and I am going to carry it on through, as well as time will permit, towards the modern breeds. I will not do much talking, but will use the chalk. Most of the writers claim that this *Banciva* is the progenitor of most of our breeds of poultry. It is certainly most like the common variety. The Someretta is a bird very similar to the *Banciva*, and some claim to have crossed it with this bird and with the small-combed birds; but that experiment has been unsuccessful in most cases. The Someretta, as a rule has a coarse tail and much lower and it is much darker than the Banciva. The barred plumage may have come through the Someretta; the hackles are barred, commencing half way down the neck, it carries its tail more like the Hamburg, and it has a long slender body like the Hamburg. The leg is carried well forward as is often the case with the Hamburg.

During his talk Mr. Sewell made a beautifnl chalk illustration of the *Gallas Banciva* cock.

Now we will pass on to what we think is the next to the wild jungle fowl, and that is the old English Game. I have a sketch here of a black-breasted old English cockerel. The old English Game is very much like the old jungle fowl, the Banciva, except that he is larger. If you saw one of those Bancivas running in the brush you might think it was an overgrown Bantam. They will not go over from 1¾ to 2 pounds. The English Game has white legs. They say it is one of the very finest table fowl.

Q.—Do you consider that a very favorable type of a table fowl?

A.—They consider that on the other side, and a lot of people cannot afford to buy them. These birds were brought to England by the Romans some eight hundred years ago along with the pheasants and the wild deer.

The next I am going to sketch is a little Aseel. I will sketch you a bird that took first prize at the Dairy Show in England. This little bird

stands very little higher that the old jungle fowl, but they weigh from three to five pounds. They are just as solid as you can press them, just one compact ball. They are broad on the back and they have light colored legs with some grey in the plumage. The old fanciers in London claim that they are direct descendants from the jungle fowl without any modern crossing from any other bird.

The next we take up is a bird that is twice as tall, up to the second joint of his leg he would be about the height of that fowl, that is the Malay. Both the Malay and the Aseel are broad in the skull. The English people like the Malay to stand as straight as a line.

The longest fowls I saw in England were the Light Sussex. At the Royal Agricultural Show, I was shocked beyond measure. I went around a lot of birds that looked like Rhode Island Reds, and they were a lot like Jubilee Orpingtons, and they told me they were Speckled Sussex. The Speckled Sussex and the Jubilee Orpingtons are the same thing. I should go to Sussex if I wanted to go into Orpingtons.

The Polish is the next fowl I shall sketch. It may be an older bird than the Dorking. I believe the Hamburg is the older one of the two. If you go into some of the old galleries in Europe or Amsterdam you will find paintings by the old Dutch painters, and you will see pretty good Polish birds in the paintings. No one in this country seems to think of the Polish as a table fowl, but they make a very good table fowl. The Dutch claim the Polish fowl came over from Italy. The Houdan is not unlike the Silver Polish in many ways.

Mr. Edward Brown claims that one line of progress in poultry went on around through Russia and into Asia, and that another line went around the Mediterranean. The Leghorn is between the Dorking and the Game.

Q.—What variety do you think came through Russia?

A.—They have in that country a fowl they call the Orloff. They have them both black and white in their colors; those that I have seen shown in this country are much lower on the legs than the birds I saw illustrated. They have a carriage like the Indian Game. The Leghorn men are now trying to get a bird with a longer back. Our standard classes the Ancona after the Minorca. I think the Ancona should be classed with the Leghorn. You can get a Minorca three pounds heavier than a Leghorn, and still keep to type. They are as heavy as the Java used to be.

We will now take up the Hamburg. The bars in this bird should go right straight from one side to the other. In breeding poultry you should not cross a bird with other types, because by doing so you are only breeding mongrels, and you are increasing the habit of mongrelizing. When you have a male bird that has four bars on the breast or five bars, try and mate it with a female that has the same number and they will match together. Do the same thing with your Leghorns. Breed five points to five points, not six with four, or six with three and do the same thing with the Dark Brahma and the Cochin. When you have a good thing preserve it and keep it. Never touch a Cochin with a stick, because if you do it will close up and tighten the feathers into the body, and that is the very thing you do not want in a Cochin. The Java, in all probability, was made up from some native stock, and something that was crossed with the Langshan. One reason why I know the Langshan and Java were closely related is because if you cross a Langshan with almost anything you will get something like a Java.

Now, I will put on the board a picture of the first Brahma cock at Boston Show. There is no doubt the Brahma is allied with the Cochin.

Early writers tried to make the people believe that they came from India, but travellers say they can never find that bird in India. At Boston four of the leading Brahma breeders have gone into the Columbian Wyandotte. If people won't buy Brahmas with feathers on their legs they are going to sell them Brahmas with the feathers off, and there is certainly a demand for the Columbian Wyandotte.

I will now put on the first prize Wyandotte cock at New York. The bird was shown by Mr. Dawson, of Niagara-on-the-Lake. A great many people confuse the Wyandotte with the Plymouth Rock. The wider you get the strip on the back of the Wyandotte the broader it appears across the back. There are too many Plymouth Rocks being shown with puffy tails, and that is not the standard of the Plymouth Rock.

Mr. McNeil: I have learned more to-day and seen chickens made faster than I ever did in my life.

The Chairman: I certainly have reason to thank Mr. Sewell for the patience he has shown in doing so much of this chalk work this afternoon, and I am sure we all appreciate it, especially the picture he made of that White Wyandotte. (Applause.)

POULTRY BUSINESS IN THE OLD WORLD.

By Franklane L. Sewell, Buchanan, Mich.

I am sure I am glad to be with you again to-night. As you found out this afternoon, I work almost entirely with pictures. We assume that all of you are interested in poultry; most of you are already started in the business. I have brought together these series of pictures principally to interest the fanciers that gathered last summer at the American Poultry Association at Niagara Falls. I hunted for six months for these pictures for the *Reliable Poultry Journal*, and at their expense. The first picture I will show you is the great centre market in London, called the Smithfield Market, and I will show you the markets of Paris and Brussels, and show you some of the best types of fowls we found. In England some of the best came from Sussex, and some as far up as Yorkshire. I will show you pictures of some of the poultry dressed for the market as they do it in England.

Mr. Sewell then exhibited to the audience a number of beautiful lantern slides, showing some of the poultry markets in Europe; also the manner in which the birds were dressed for the markets in Brussels, Paris and London. He also put upon the screen some beautiful specimens of poultry. His comments on the pictures, and his description of the poultrymen and their methods of caring for the stuff, killing, dressing and marketing their poultry, were interesting in the extreme. Mr. Sewell's address was very much appreciated, and he was loudly applauded at the conclusion.

The Chairman: I do not know that we just could appreciate what Mr. Sewell has done for us this evening. This afternoon he gave us some beautiful illustrations of what we should work for in the best type of poultry, and this evening he has given us some beautiful pictures, showing what is being done in the poultry business in the old world.

A DEMONSTRATION IN JUDGING.

By William McNeil, London.

Young men have opportunities that we old breeders never had. I would like to be where some of you are to-day, and I would like to have had the chance that you have, but my programme is full now, and when I have a good chance to learn something I am no good. There is nothing that gives me more pleasure than to come to Guelph; I like to meet the Guelph poultrymen in particular. I don't think there are any better men than the poultrymen. I have been in the business for forty years, and I have never struck better business men and more honest, straight business men as a class, than the poultrymen. There are some of you who are merely farmers, but you are coming here to get pointers. Farmers are rather slow for me, but we are making something out of them. The best stuff in the world is the farmer.

Mr. Sewell was speaking yesterday about some of his American friends going to England and picking out some Hamburgs and paying big prices for them, and I would send to the same man and pay a very small price and take the birds to Boston and New York and beat these Americans. They had the money, but I had the other thing. I suppose it would be difficult for some of you to send to the Old Country for birds the way I have done it. Forty years ago when I came out to this country I did not have much chance, and when I would send to any of those very best breeders in the Old Country I would say here is the kind of bird I want, describing the bird, and I would say if this kind suits me when it comes you will get your money, and if he does not suit me he goes back, and I will pay the express charges; and I always got a ten dollar bird for five dollars. So you see it is the way you do business. Whatever you do, when any man trusts you and sends you money, if it is five dollars send him a bird, if possible that is worth five dollars and fifty cents, because you are not going to lose by it. I was in the grocery business, and whenever a customer came into my store I would serve him well, and then he would tell his neighbors; for if you haven't got anything that a customer wants to get even then you will get his good will. If a man sends you five dollars for a bird and you send him a four dollar bird you are done with him and with his neighbor. Honesty always pays. When I go to Boston and New York and these places it tickles me to death when I meet one of my customers. If I had cheated him I would want to get around the corner to get out of his way. Some people say I have not told them all I know. Well that would be impossible, because then I would have nothing left. (Laughter.) I cannot tell you the way I go at the work; that has always been my drawback. I can go along and feed the chickens, and I know how to feed them. but when I come up here to tell you how I do it, then I say to myself, "I guess I don't know anything about it." I know how much to feed the chickens and when I go to feed them, I feed them according to their appetites, and I am very careful. I used to keep twenty-two varieties, I work just as hard now, and I have only eight; but I have them in better shape, and I have more room. Eight varieties to me is very little, but I never made as good an exhibit and had my varieties in as good shape as I had at this winter show. I do not want to advise any of you to go into it largely, if you have room for twenty hens, keep ten. Few and far between is the right way to keep chickens. Give them lots of room.

The stick is one of the great difficulties in judging poultry, because the minute you put a stick to a Cochin, it tightens up, and there is no Cochin about it. The very first thing the average judge does is to get a stick in his hand, and then he spoils your birds. It is all right with the Game, if it has been thoroughly trained, because then he will stand up, but when you touch a Cochin it just gets them out of shape. The Cochin should be fluffy.

The first bird I am going to look at is a Black Hamburg. The first things you should look at in judging a Black Hamburg are his comb, the ear-lobes, and wattles.

I am always contending that color should be, at the very least, seventy per cent. of the bird, and the shape not more than thirty. Some people will tell you that color does not make a bird. I contend that it does. Buff makes a Buff Cochin, white makes a White Cochin; they are all about the same shape.

The CHAIRMAN: Is not that exaggerating the fancy side to the detriment of the utility side?

Mr. MCNEIL: I say we should put seventy per cent. to the color. Take the Java, Rhode Island Red, and the Plymouth Rock, and if you cut their heads off and their legs you would not know which it was.

The CHAIRMAN: If you were judging a utility class what would you allow for color.

Mr. MCNEIL: I would go in for shape, and if I came across a good pen of White Rocks or White Wyandottes, and they were about equal, I would decide in favor of the color.

Q.—You would want a utility shape bird?

A.—Yes, I am strongly in favor of color. Take the Silver Penciled Hamburg and there should be at the very least twenty-five points allowed for the sickle feathers. The standard of perfection only gives ten per cent. for that. You can get a solid black tail on any Black Hamburg just about right, but there is only one Silver Pencilled out of twenty that will be really anything like fair, and I would say in a case of that kind it should be fifteen for Silver Pencilled and ten for black.

Take the Orpington and the Rock. Sometimes you would not know the difference; but of course we know the Orpington should be much shorter on the legs.

Q.—You mean the buff variety?

A.—Yes.

Q.—Take a Wyandotte; and supposing you had a very white bird, but it is a distinct Rock shape, and another bird that is a distinct Wyandotte shape and a little creamy, which of these birds would you give first prize to?

A.—Supposing the shape was so much superior to the other bird, and the other was so much inferior in the color, I would have to score the bird, but I would be in favor of the color to a certain extent.

Q.—I am taking two birds that are equal, but one is a distinct Rock shape, and the other is a distinct Wyandotte shape?

A.—I would have to give it to the shape. I have seen White Rocks shown out of White Wyandotte pens—young Cockerels come to the show and win, and they were really White Wyandottes.

Q.—In the standard that you have taken after you have taken off the valuation of the legs and head is not what is left for color?

A.—I think it would be about twenty-eight for color and twenty-three or twenty-four for shape when the others are taken off. In the standard they allow for the shape of head and color of comb, eight; forecrest, eight; wattles and ear-lobes, two; color four, neck four, color four; back, four; color, four; breast shape, five; color, five; the body shape, five; color, three; for the wing shape, four; color, four; the bill shape, four; color, four.

Here I have a Black Hamburg. It is a pretty good cockerel, but the tail is just a little too high. We have a Poultry Association in London, and we have so many birds every night, and we score them. The tail of a Black Rose Comb runs out straight from the base of the bill before it curves. This Black Hamburg's tail is a little too high. I think about 45 degrees is about right for the Hamburg. This bird has a good back, but his comb is faulty. A lot of our judges are theory men, and are not practical. I have done the breeding, and I have done the feeding. That ear-lobe is wrong; that is not a Hamburg ear-lobe, it is too big and it is not round.

This bird is a good color, but it has purple barring. It would make a pretty fair old bird if his comb was fixed. It is a little too long, but that could be improved on.

Here is a very good type of the Black Hamburg hen. These are the fowls that the farmers should keep. I do not know any other hen that lays as many eggs as the Hamburg. Down at Ottawa they have the record for the best layers.

Now this Partridge Cochin is not quite good enough in color. The female should be a good deep mahogany. This bird would do for a breeder, but it would not do for a show bird. This cockerel's hackles should be a rich red and there should be a strip down each feather, and it should have a slate-black breast. We would use a bird like this for a pullet breeder.

Here is a Rhode Island Red. That I look upon as a pretty good type. He is not uniform in color; there is a great deal of difference between red and orange. He is about the right height, but a little short in body. If he was a bigger bird he should be a little longer in the back. Here is one feather that is wrong; that slate color should not be on that feather. The only Rhode Island Reds that I can remember that were nearly perfect were two pullets shown at the Winter Fair. They were a nice red all the way through. This cock would be better if he had a little more black on his wings. This hen is a very good type but it is off on color.

Q.—Is not that fairly good for a hen?

A.—It is a good color for her, but not for a better one. About a dozen feathers taken out of that bird would make it beat the other one. You can see how much better the taking of these two feathers out of this side makes it look. When you put a bird in a show put one in that will win. There is nothing wrong about it any more than a man straightening up when he goes out in public.

Q.—Would you breed from that bird after you doctored him up in that way?

A.—Yes, that is the right way to do. I fit up a bird to breed.

Q.—If that is true why don't the Pit combs come dubbed?

A.—It is coming pretty well; they haven't the combs they used to have. The trouble with the majority of game breeders is that they never look at the hen. If I were going to breed Games, I would not breed from a hen that didn't have a straight comb. Take a Game pullet with the comb lying over, and she is no good.

In Leghorns you can get better combed cockerels from a straight combed hen than you can get from one that lies over. I would set the combs up before I would breed. How is it we get birds so much better to-day than formerly? I believe it is nothing else than putting them up for show.

The next bird we have is the Silver Spangled Hamburg. I do not think there is anything nicer in the world than a Silver Spangled Hamburg. I would not look upon this cock bird as good for either showing or breeding purposes. His spangles are hardly large enough. He is a little creamy, but in time would wear out. His spangles are not large enough or good enough in color, and he is off in the tail. He has a fair breast, but it is hardly large enough. That is what we call a fair shaped Spangle; that is the kind we Americans want, but in the Old Country they want more of a chop-off. This bird has a poor comb. He has been a little abused, and one side of his ear-lobe is damaged. His hackles are not long enough. He has a very fair tail. He is a pretty fair bird, but not fit to win at Boston or New York. At Boston show, you will see the best class of Hamburgs you will find outside of England.

This Rock is a pretty nice bird. Just now he is a little wrong in the back; that is caused by the fact that he is lacking in the hackle, and that makes his back look long. I have got to be careful about what I say about this kind of a bird here, because this is the home of the Barred Rocks.

This bird has a pinched tail, but it is a fair one, and he is fair under the feather, but a little weak. We call them weak when we get feathers without a bar. A feather like this should be barred right down. It is a very good bird and is well-barred in all sections.

Q.—Don't you think he is a little dark on the outside color?

A.—This bird has something peculiar about him; the black seems to be such a deep black that it shows up. His comb is not the proper shape, but he is a bird that would win in a great many classes.

Mr. SEWELL: There are two points in that bird that you want to get, and that is to have him moult his hackle two or three weeks before he moults his tail so that he will have a longer hackle and a shorter tail. Is there any food that would produce feathers in the fore part of the bird earlier than in the rear part?

Prof. GRAHAM: That bird will moult his tail a lot quicker than the hackle. The first tail he had was a poor one, and it was about three or four shades darker than his body, and every time it is moulted out it seems to come better, and if you were not showing too often you could have a new tail for every show.

Mr. MCNEIL: I have found in the fall that a great many people slacken up on the feed if they find that their poultry are not doing well. That is a great mistake, because there is a big strain on the constitution of the bird when he is getting his feathers. That, I think, would be a great thing for our friend, Prof. Graham, to study this summer to see if he can make them grow their feathers better.

We will now take a Wyandotte. This bird is very poor. I always like to see a Wyandotte have a head and neck something like a French horse. The French horse has a little head with a nice neck. I don't like the tail in this bird, he has too many sickle feathers. He has a pretty fair saddle, and a pretty good shaped breast, but the tail is a little too long. If these two top feathers were taken out, and the other ones turned down a little, it would shorten the length of the tail, and make it lower and more of the Wyandotte type. We should not have a cobby bird for a Wyandotte; while he wants to be blocky, he must have length in the leg. Do you want a long-

legged Wyandotte? No; I want a leg in proportion to the size of the body. When you get a little, blocky body he is too short. Have a short thigh, but medium long to the leg, so as not to give him that stunted appearance. This is a good white bird, but creamy on the surface. I think the Wyandotte hen should be near the shape of the Brahma; wide across the skull so that it would come a little over the eye. The beak of this bird is a little too long; if there was a little piece taken off the upper part it would shorten it up. The comb is a poor one and would want a little fixing up, otherwise, it is a pretty fair bird.

Q.—Is it heavy enough?

A.—I suppose this bird will go about five and a half pounds. This hen is too squatty; she is more the shape of a Japanese Bantam.

Q.—Tell us what you consider the difference between a Wyandotte and a Plymouth Rock in the length of legs?

A.—I say a Rock should be from a half to an inch longer than a Wyandotte in the leg.

Q. Do you like a Wyandotte that is broad in the shoulders and that tilts a little forward?

A.—No; I want them to stand with the head not too high.

Q.—Don't you want an arched neck in the Plymouth Rock?

A.—No.

Mr. Sewell: The neck of a Plymouth Rock is tapering and the neck of a Wyandotte is erect.

Q.—Will yellow corn affect Barred Rocks?

A.—Yes, it will have a tendency to make them richer.

Prof. Graham: I fed all the White Wyandottes yellow corn and it was was hard to tell them from Buffs, they were just a good straw color, and as we gradually reduce the corn they whitened out a little. I can show you a hen that practically won on color at the exhibition in Madison Square Gardens, and now she is yellow.

Q.—How does that work with Buff Breeds?

A.—You should feed yellow corn, but if you feed too much your birds will get so fat that they are of no use to you.

Mr. Henry: As senior member of the short course poultrymen. I think I should move a vote of thanks to Prof. Graham for the interest he has taken in us and for bringing us together to hear such successful discourses. Carried.

Mr. Sewell: I wish there was some one here who could tell you how we in the United States appreciate the work that is being done at Guelph. I cannot do it in words, but I want to say that we look upon the people in Canada as among the most earnest people in the world in the matter of growing fine live stock. I used to live close to Chicago, and always attended the Fat Stock Show from the time I was twelve years old until I was twenty-five, and I have always noticed that some of the very best stock there was brought there by Canadian men. A great deal of it was imported English stock, but it cost a lot of money and time to bring it over, and I can tell you the Chicago people appreciate the fact that these things were brought there. We know that Prof. Graham has tried to have the best kind of an Institute that possibly can be held, and I hope he will have every encouragement.

The proceedings of the Institute were then declared closed.

REPORT

OF THE

WOMEN'S INSTITUTES

OF THE

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1907

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TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Women's Institutes of Ontario for 1907.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1907.

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WOMEN'S INSTITUTES OF ONTARIO.

REPORT OF SUPERINTENDENT.

The records of the twelve months ending May 31, 1907, indicate another season of rapid growth and satisfactory work on the part of the Institutes throughout the Province.

We have organizations in 84 districts with branches established at about 400 points, 382 of which are holding regular monthly meetings. The membership for the twelve months ending May 31, was 10,964. That reported last year was for seventeen months, and 485 less than that reported for the twelve months ending May 31st last. The number of meetings held during the year was 3,047, with a total attendance of 71,154.

During the year meetings were held in North Peterboro', North Victoria, and Haliburton, at points which had never before been favored by either Farmers' or Women's Institutes. Organization was effected at a number of places in these new districts, and, with another season's work it is hoped that these societies will be placed upon a good working basis.

The meetings held throughout the Temiscamingue district, Parry Sound, the Algomas, and the district lying north-west of Port Arthur, have been attended with considerable interest, and the officers of the Institutes are loud in their praise of the good which is being accomplished by the monthly meetings. We receive from this territory some of our most encouraging reports and best papers prepared by the members for the regular monthly meetings.

It is gratifying to know that in many localities the girls and young women are being enlisted in the work; and in such localities the Institutes are meeting with greater success than when only the married ladies took part. The day is fast passing when the Institute is looked upon as a place to discuss food topics only. All matters which are of interest to homemakers are being considered. This will be brought forcibly to the reader by referring to the list of topics given in the new Hand Book. These topics have been taken largely from the reports of meetings held by the Institutes.

The Department is indebted to the noble band of officers and lecturers who have made largely for the continued success of the work. In fact the progress of the individual organization is usually due to the enthusiasm and untiring efforts of two or three persons, and to the acceptability with which the delegates sent out by the Department are received. When the work of the Institute is placed clearly before a representative gathering of ladies, there is usually very little difficulty in organizing, and, in most cases, a few

months only are required to place the Institute upon a good working basis.

The following letters will indicate the progress which some of the newer Institutes have made during the past summer:—

SHANNONVILLE, Nov. 1st, 1907.
Hastings County.

Superintendent Women's Institutes:

Dear Sir,—Yours of Oct. 30th received. The Quinte Branch of Women's Institute was organized Aug. 7th, 1907, with a membership of twenty-five. Meetings have been held since on the first Wednesday of each month. At the September meeting two new members were added, and one at the October meeting, making a total of twenty-eight paid-up members.

I will enclose a copy of our programmes for 1907-08, which will give you our plans for the winter. Yours respectfully,

MARY CLAZIE, Sec

PROGRAMME.

Quinte Branch, Women's Institute, 1907-08.

For each of the monthly meetings indicated below, provision is made for music, and either readings or recitations, to supplement the topics which are announced for papers and discussions.

October—"Care of Winter Bulbs."

November—"Thanksgiving for Prosperity and Welfare of our Dominion."

December—"Christmas Preparations," "Christmas Candy," "Christmas Gifts."

January—"Winter Evenings in the Country."

February—"Home Nursery: (*a*) Bathing a Patient; (*b*) Changing Sheets; (*c*) Changing Clothing; (*d*) Making and Applying Poultices."

March—"Hygiene and Ventilation."

April—"The Influence of Home and Surroundings."

May—"Best Months to Pack Butter and Different Methods of Preserving It."

June—"Saving Steps on the Farm."

Meetings held the first Wednesday of each month at 2 p.m. In response to the roll call each member either asks a question, answers some one else's question, or gives a suggestion.

HARKAWAY, Oct. 28, 1907.
(Hastings County.)

Superintendent Women's Institutes:

Dear Sir,—Yours of the 25th received to-day. In reply to your questions I may say we, as members of the Temple Hill Branch of the Women's Institute, have held four meetings. We have only eleven paid members as yet, but a number have said that they were going to join at our next meeting.

I may say that the women of this locality are just beginning to be interested in the Institute. The Institute here was organized in a very busy time, and it was only at our last two meetings that much interest was manifest. It may take a little time, but I believe that we will yet have a real live Institute at Temple Hill.

I remain, yours truly,
(Miss) MARY E. SMITH, Sec.-Treas.

MINDEN, Nov. 4th, 1904.
(Haliburton.)

Superintendent Women's Institutes:

Dear Sir,—In answer to your letter of the 30th October, I enclose list of the members of the Minden Branch of the Women's Institute, and am pleased to be able to say that although we have not very many members as yet, still we have been very successful. We hold a meeting on the third Wednesday of every month, alternately in the afternoon and evening: in the afternoons in Mr. Delamere's hall, and in the evenings at one of the members' houses.

All the members are very enthusiastic, and we have had some very good papers. We have taken a part of the subjects given for each month in the Rules and Regulations.

Very truly yours,
MRS. S. C. DEAN, Sec.-Treas.

The attention of readers is drawn to the report of the annual convention given herein. The addresses delivered by Prof. Dean, Miss Shuttleworth and Dr. MacMurchy upon "Milk—Production, Care and Handling, and From the Doctor's Point of View," have been published separately in bulletin form. Prof. Evans' address upon "Color in the Household" will appear in bulletin form when published.

The belief of the Department in the influence for good which the Women's Institutes are exerting upon the home life in the country districts, villages, and towns of the Province, has been strengthened by the experiences of the past year. There is a steadily growing confidence upon the part of Institute members in the beneficial effect that the Institute is having upon the communities where organizations are established, and district officers are awakening to the necessity for canvassing the territory which they represent, and, if possible, giving every home-maker an opportunity to attend the monthly meeting near her home, where she may meet with those who have common interests, for the purpose of considering ways and means whereby the life of the community may be bettered through the advancement of the homes and individuals therein.

Conventions have recently been held in two counties. These meetings have been organized by the officers representing the different ridings, and the speakers have been largely secured from among the members of the local branches. By assuming the responsibility of conducting these county conventions the officers have learned of the strength which they have within their ranks, and are encouraged to extend their field of operations over the whole district. We can heartily recommend this line of work, which places the responsibility largely upon the Institutes concerned, and is the means of further developing local talent.

There is a strength within the Women's Institutes of Ontario which, directed by the wisdom of the excellent band of officers and lecturers, is bound to exert an influence which will tend rapidly to bring life in the rural districts to be the envy of the city residents in the years to come. We can heartily and sincerely recommend that the liberal support given by the Department of Agriculture to these organizations of home-makers be continued until every locality in the Province enjoys the advantages which can be secured through the Women's Institutes better than through any other organization which has yet been established in this fair Province.

GEO. A. PUTNAM,
Superintendent.

Institute District.	Membersh	No. of meetings held.	Total attendance.	No. of papers read or addresses delivered.	Receipts.					Expenditure.								
					Cash from last report.	Members' fees.	Grants.	Miscellaneous.	Total receipts.	Expenses for meetings.	Officers' salaries and expenses.	Postage and stationery.	Printing and stationery.	Lecturers' wages and expenses.	Periodicals for members.	Miscellaneous.	Total expenditure.	Balance on hand.
					$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Amherst Is	61	10	378	22	4 71	18 00	20 00	1 95	44 66	4 50	9 00	2 01	.....	2 00	10 55	10 08	38 14	6 52
Brant, N	117	43	1,167	95	10 90	43 50	44 00	32 20	130 60	26 55	16 40	5 86	10 00	5 45	4 00	36 14	104 40	26 20
Brant, S	182	29	679	58	56 36	38 98	59 00	7 45	161 79	21 26	25 00	10 77	6 25	9 80	12 97	.....	86 05	75 74
Bruce, C	94	24	532	35	45 65	18 25	73 00	.....	136 90	15 84	14 25	3 51	6 25	17 50	5 85	28 31	91 51	45 39
Bruce, N	.....	6	62	13	.....	7 00	.....	33 81	40 81	.....	.....	2 43	.....	.....	23 50	4 75	30 68	10 13
Bruce, S	51	11	302	14	42 50	11 25	38 00	3 85	95 60	.....	10 00	1 01	4 25	8 55	.....	10 91	34 72	60 88
Bruce, W	114	35	615	35	14 19	21 75	48 00	6 49	90 43	4 65	17 00	3 27	5 35	7 85	4 55	25 20	67 87	22 56
Dufferin	190	76	1,475	115	58 18	34 25	88 00	54 60	235 03	17 20	32 50	12 02	3 00	26 88	16 45	62 01	170 06	64 97
Dundas	63	16	439	28	15 45	7 50	10 00	.....	32 95	16 10	.....	4 05	1 50	... ..	.....	.....	21 65	11 30
Durham, E	205	51	699	27	51 67	56 60	69 00	15 73	193 00	3 80	.....	5 72	7 89	11 75	4 90	89 09	123 15	69 85
Durham, W	224	53	1,413	56	50 48	26 75	72 00	10	149 33	1 50	20 00	8 05	16 00	13 93	29 20	31 49	120 17	29 16
Elgin, E	196	42	1,720	87	17 02	35 75	75 00	69 22	196 99	18 13	30 00	8 13	8 15	30 70	.....	57 26	152 37	44 62
Elgin, W	80	20	492	16	19 98	16 50	38 00	6 33	80 81	2 00	10 00	3 15	4 00	6 00	2 25	15 75	43 15	37 66
Essex, N	56	24	966	41	26 94	23 50	48 00	26 61	125 05	1 92	10 00	1 24	4 75	8 00	16 62	26 55	69 08	55 97
Grey, C	253	96	1,963	110	109 97	48 75	87 00	117 25	362 97	16 74	20 00	9 68	6 70	34 57	29 55	129 66	246 90	116 07
Grey, N	208	60	1,111	65	50 49	35 00	59 00	15 25	159 74	9 25	25 50	7 73	3 50	17 25	8 74	9 65	81 62	78 12
Grey, S	101	27	476	58	12 28	23 00	38 00	6 85	80 13	4 18	10 00	2 36	2 70	25 05	5 40	11 00	60 69	19 44
Haldimand	443	121	2,983	240	130 62	74 85	77 00	2 41	284 88	30 10	52 00	13 73	23 35	28 65	22 50	9 53	179 86	105 02
Halton	632	114	2,844	168	90 85	109 50	91 00	157 60	448 95	49 45	46 05	16 46	15 50	25 13	10 45	174 83	337 87	111 08
Hastings, E	153	35	948	67	43 53	38 75	48 00	58 08	188 36	5 00	25 00	4 93	12 65	19 50	60	75 35	143 03	45 33
Hastings, N	121	49	857	57	71 23	29 75	41 00	.....	141 98	2 00	15 00	4 42	2 50	75	1 25	48 53	74 45	67 53
Hastings, W	53	12	842	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Huron, E	98	34	683	34	7 62	25 25	41 00	4 77	78 64	25 55	28 00	3 89	3 00	7 75	.....	5 97	74 16	4 48
Huron, S	62	20	316	38	23 19	17 50	52 00	19 67	112 36	15 00	15 00	3 95	11 25	8 85	11 75	30 06	95 86	16 50
Huron, W	180	41	816	62	34 33	32 50	44 00	9 45	120 28	8 90	26 40	7 29	.....	1 35	1 65	49 09	94 68	25 60
Kent, E	55	14	267	15	17 10	5 75	10 00	7 23	40 08	7 50	.....	1 08	1 50	8 50	.....	.....	18 58	21 50
Kent, W	132	49	1,149	87	35 59	27 50	54 85	24 85	142 79	6 00	17 25	9 36	16 25	16 40	2 55	23 52	91 33	51 46
Lambton, E	40	16	556	30	3 19	14 00	13 00	3 00	33 19	3 45	5 00	1 15	.....	2 85	.....	3 50	15 95	17 24
Lambton, W	46	16	326	15	15 54	9 25	18 00	.....	42 79	2 00	.....	3 92	2 25	2 70	.....	9 20	20 07	22 72
Lennox	25	9	145	18	7 99	12 75	15 00	13 65	49 39	.....	7 00	1 71	1 75	.....	15 75	1 82	28 03	21 36

REPORTS OF LOCAL WOMEN'S INSTITUTES FOR YEAR ENDING MAY 31, 1907.—*Continued.*

Institute District.	Membership.	No. of Meetings held.	Total Attendance.	No. of papers read or addresses delivered.	Receipts.					Expenditure.								
					Cash from last report.	Members' fees.	Grants.	Miscellaneous.	Total Receipts.	Expense for meetings.	Officers' salaries and expenses.	Postage and Stationery.	Printing and advertising.	Lecturers' wages and expenses.	Periodicals for members.	Miscellaneous.	Total expenditure.	Balance on hand.
					$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Lincoln	237	27	544	45	16 24	77 50	31 15	1 45	126 34	6 50	20 00	5 61	6 00	13 55	.....	43 66	95 32	31 02
Middlesex, N.	255	67	1,374	106	107 84	52 75	84 00	32 15	276 74	25 05	8 50	9 01	7 55	17 05	10 87	57 47	135 50	141 24
Middlesex, W.	117	21	648	32	17 45	27 25	32 00	.....	76 70	1 50	5 00	2 44	3 10	10 63	15 71	14 45	52 83	23 87
Monck	66	44	585	49	7 69	29 15	44 00	28 82	109 66	2 50	18 00	8 64	2 65	15 53	3 00	39 16	89 48	20 18
Muskoka, C.	47	.....	.....	.....	5 62	9 50	13 00	2 87	30 99	20	.....	2 50	.....	.....	.....	11 34	14 04	16 95
Muskoka, S.	91	58	691	241	70 78	19 75	40 00	38 59	169 12	2 50	5 00	4 99	1 00	.....	8 30	43 07	64 86	104 26
Norfolk, N.	62	19	550	52	34 24	3 00	39 00	.....	76 24	5 00	10 00	2 55	1 75	9 90	.....	3 65	31 85	44 39
Northumberland, E.	161	35	1,284	56	51 57	46 25	61 80	2 90	162 52	6 53	25 00	3 66	11 05	10 80	32 87	28 67	118 58	43 94
Northumberland, W.	151	45	974	79	42 64	21 75	65 00	37 00	166 39	2 33	28 50	4 08	5 40	8 50	10 84	42 36	102 01	64 38
Ontario, N.	14	5	12	4	21 65	3 50	30 00	.....	55 15	6 50	10 00	5 40	10 90	5 25	.....	.....	38 05	17 10
Ontario, S.	54	24	345	32	53 56	14 00	56 00	13 98	137 54	8 57	32 50	5 72	1 35	16 50	2 72	4 75	72 11	65 43
Oxford, N.	214	54	1,278	79	27 01	42 75	59 00	5 49	134 25	12 10	.....	5 00	14 45	27 11	10	27 80	86 56	47 69
Oxford, S.	282	76	1,504	92	82 12	50 75	96 00	20 55	249 42	9 67	20 00	15 15	1 10	35 35	.....	44 63	125 90	123 52
Peel	775	82	4,116	157	65 02	74 75	76 00	37 60	253 37	17 75	76 30	12 20	16 75	27 41	.....	47 69	198 10	55 27
Perth, N.	89	18	507	26	27 03	11 75	32 00	10 21	80 99	7 15	10 00	2 14	2 36	6 50	15 40	21 60	65 15	15 84
Perth, S.	61	22	514	33	27 71	18 25	22 00	20 29	88 25	7 65	11 49	4 06	75	17 75	.....	32 58	74 28	13 97
Peterboro, E.	52	11	201	8	10 27	19 25	10 00	44 80	84 32	4 90	.....	3 60	1 50	4 00	2 00	57 38	73 38	10 94
Peterboro, W.	73	10	186	12	8 25	12 50	10 00	8 70	39 45	10 00	10 00	1 15	4 25	4 85	4 00	90	35 15	4 30
Renfrew, N.	134	38	950	41	27 26	27 50	28 00	21 75	104 51	26 75	15 00	5 21	3 50	3 00	14 95	21 15	89 56	14 95
Simcoe, C.	54	62	1,082	90	55 74	18 75	75 00	26 63	176 12	12 13	12 85	9 27	4 50	18 85	15 05	30 86	103 51	72 61
Simcoe, E.	20	6	200	8	.....	6 75	.....	12 70	19 45	.....	.....	1 26	1 82	5 00	.....	4 95	13 03	6 42
Simcoe, S.	31	11	264	15	6 56	7 25	20 00	.....	33 81	15	5 00	82	.....	2 00	13 00	10	21 07	12 74
Simcoe, W.	146	67	1,364	102	55 51	35 25	86 00	85 70	262 46	48 67	15 75	5 89	1 50	.....	15 71	47 39	134 91	127 55
Union	68	15	571	25	8 32	22 75	34 50	28 10	93 67	4 70	32 00	2 51	2 75	5 25	23 00	14 20	84 41	9 26
Victoria, E.	95	26	558	30	10 32	11 75	35 00	12 37	69 44	4 43	17 45	3 76	12 75	5 74	.....	.....	44 13	25 31
Victoria, W.	123	34	862	36	39 07	28 25	41 00	3 84	112 16	1 35	10 00	5 87	4 69	7 35	2 41	31 40	63 07	49 09
Waterloo, N.	170	46	1,739	95	55 45	37 50	44 00	.....	136 95	5 74	15 00	8 84	11 25	17 10	7 73	11 90	77 56	59 39
Waterloo, S.	308	41	1,248	60	4 06	67 25	34 00	84 64	189 95	29 82	30 00	10 35	6 50	36 29	1 00	48 63	162 59	27 36
Welland	237	42	859	55	88 51	45 25	105 00	8 34	247 10	3 00	18 65	7 96	6 46	10 17	22 36	43 86	112 46	134 64
Wellington, C.	289	98	3,835	119	49 49	41 50	77 00	48 17	216 16	32 88	25 00	8 34	12 55	60 30	11 35	11 48	161 90	54 26

REPORTS OF LOCAL WOMEN'S INSTITUTES FOR YEAR ENDING MAY 31, 1907.—*Continued.*

Institute District.	Membership.	No. of Meetings held.	Total Attendance.	No. of papers read or addresses delivered.	Receipts.					Expenditure.							
					Cash from last report.	Members' fees.	Grants.	Miscellaneous.	Total receipts.	Expense for meetings.	Officers' salaries and expenses.	Postage and Stationery.	Printing and advertising.	Lecturers' wages and expenses.	Periodicals for members.	Miscellaneous.	Total expenditure.	Balance on hand.
					$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.
Wellington, E.	149	41	527	52	24 88	39 75	75 00	8 05	147 68	12 48	8 00	9 36	6 70	14 75	28 37	34 05	113 71	33 97
Wellington, S.	91	55	878	62	57 98	20 00	65 00	26 00	168 98	40 11	10 00	6 29	3 00	5 70	32 03	26 30	123 43	45 55
Wellington, W.	135	34	1,582	63	75 15	34 00	62 00	34 95	206 10	23 75	17 80	5 51	4 50	49 74	.....	.....	101 30	104 80
Wentworth, N.	151	56	1,418	64	35 70	37 20	77 00	42 45	192 35	40 50	19 00	5 48	6 71	7 14	3 05	16 37	98 25	94 10
Wentworth, S.	277	99	2,623	146	107 58	78 50	110 00	28 38	324 46	45 60	27 00	36 09	24 25	48 17	7 90	58 26	247 27	77 19
York, E.	143	71	990	62	28 98	35 75	90 00	4 00	158 73	13 65	16 50	9 36	5 00	9 00	12 04	37 05	102 60	56 13
York, N.	70	14	450	26	.....	17 25	20 00	5 25	42 50	2 00	.....	1 00	.....	.....	.....	14 50	17 50	25 00
York, W.	166	44	1,219	59	41 59	17 00	57 00	29 50	145 09	12 75	15 00	6 76	18 00	36 05	.....	17 92	106 48	38 61
NORTHERN DISTRICT.																		
Algoma, C.	161	64	889	96	56 15	37 25	40 00	162 07	295 47	8 90	18 00	7 37	8 25	.....	42 35	120 65	205 52	89 95
Algoma, E.	13	9	148	9	.....	1 25	.....	.....	1 25	.....	.....	17	.....	.....	.....	.....	17	1 08
Manitoulin, E.	104	29	364	55	6 96	24 50	13 00	.....	44 46	.....	5 00	3 73	.....	.....	5 00	.....	13 73	30 73
Manitoulin, W.	100	33	474	46	.....	17 45	16 00	64 70	98 15	5 15	.....	1 83	1 00	.....	3 00	2 84	13 82	84 33
Nipissing, W.	13	6	42	13	.....	3 25	3 00	.....	6 25	.....	.....	39	1 50	.....	.....	2 50	4 39	1 86
Parry Sound	167	45	801	38	.....	32 50	9 00	128 96	170 46	7 63	.....	3 37	6 75	.....	16 73	26 87	61 35	109 11
Rainy River, N.	62	26	436	17	.....	15 50	16 00	15	31 65	6 50	.....	1 23	2 00	.....	2 35	4 42	16 50	15 15
Rainy River, S.	151	43	614	59	.....	23 00	25 00	.....	48 00	.....	10 00	5 30	.....	.....	7 70	3 85	26 85	21 15
St. Joseph Is.	93	27	342	23	21 37	21 00	29 00	60 04	131 41	55	5 00	6 80	2 50	.....	36 19	18 25	69 29	62 12
Temiscaminque	118	60	862	23	.....	20 65	10 00	69 85	100 50	8 50	10 00	1 33	3 10	.....	.....	9 00	31 93	68 57
Thunder Bay	86	34	399	71	.....	18 75	15 00	7 00	40 75	.....	.....	1 76	.....	1 80	3 15	7 60	14 31	26 44
TOTALS:					$	$	$	$	$	$	$	$	$	$	$	$	$	$
1906-7.	10,964	3,047	71,154	4,497	2,601	2,242	3,483	2,008	10,334	842	1,136	473	414	922	673	2,166	6,626	3,708
1905-6.	10,749	2,114	51,892	3,452	1,857	1,572	3,155	1,042	7,626	995	973	386	382	539	522	1,160	4,957	2,269

DISTRICT OFFICERS, 1907-8.

WOMEN'S INSTITUTES OF ONTARIO.

Amherst Island	President	Mrs. R. D. McDonald	Emerald.
	Vice-President	Mrs. Henry Filson	Stella.
	Sec.-Treas.	Mrs. S. K. Tugwell	Stella.
Brant, North	President	Mrs. J. H. Heveron	St. George.
	Vice-President	Mrs. A. Humphrey	St. George.
	Sec.-Treas.	Miss E. I. Burt	St. George.
Brant, South	Hon. President	Mrs. Lester	Burford.
	President	Mrs. A. D. Muir	Burford.
	Vice-President	Mrs. T. Stuart	Mt. Vernon.
	Sec.-Treas.	Miss E. A. Lester	Burford.
Bruce, Centre	President	Mrs. D. McIntyre	Paisley.
	Vice-President	Mrs. T. F. Jackson	Ripley.
	Sec.-Treas.	Miss A. McCaskell	Kincardine.
Bruce, North	President	Mrs. W. B. Moore	Lion's Head.
	Vice-President	Mrs. Wm. Warder	Lion's Head.
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WOMEN'S INSTITUTES OF ONTARIO.

ANNUAL CONVENTION

HELD AT MASSEY HALL, ONTARIO AGRICULTURE COLLEGE, GUELPH, DECEMBER 12TH AND 13TH, 1906.

OPENING ADDRESS.

HON. NELSON MONTEITH, MINISTER OF AGRICULTURE.

After the singing of the National Anthem, and the offering of prayer by the Rev. Dr. Bethune, the Minister of Agriculture addressed the Convention.

It is usual, on occasions of this kind for the presiding officer to make at least a few remarks. My address would be lengthy if I were to make it in proportion to the importance of the subjects to be discussed, but I shall be brief in my remarks.

We are glad, indeed, to welcome you to this Convention. We feel, and I voice the feeling of the Department, that the work of the Women's Institutes is one of the most important efforts for the betterment of agriculture in the Province of Ontario. We feel that the work of this organization is touching the home life of the people, and making for a higher standard of manhood and womanhood in the proper equipment and fitting of our homes. Apparently the work of the Women's Institutes has met with a warm response on the part of the women of the Province. The Superintendent tells me that the membership now exceeds ten thousand, which, in so short a time since its organization, speaks volumes for its popularity. However, the work is, as yet, somewhat misunderstood by our legislators, and it is for you, as the wives and daughters and friends of our legislators, to bring them to a knowledge at first hand of the work which you are doing, and in that way enthuse them with the spirit of the work. What we apparently lack to-day in every phase of agriculture is enthusiasm. We are somewhat cold and calculating, and for that reason are not so warm as we should be in our support of some movements. However, there is one thing which I note with pleasure, and that is the abiding strength of the convictions of our people, their perseverance, their stick-to-itiveness, which means so much in any work that is to be done satisfactorily.

One thing in connection with our Institute work, and especially in connection with the Farmers' branch, is the lack of the development of local talent, and that is one thing which I would ask you to avoid as far as possible at the outset of your usefulness. Utilize local talent and make the members feel that this organization is theirs and that its success or failure depends upon them. This is one of the great failures in many organizations. They have looked to the Department to send out men, professional men who have made a specialty of certain lines, and when these men do go out, the audiences are sometimes not altogether appreciative.

I wish to impress upon you the great necessity of bringing out the young women to your meetings. Encourage them to take a live and practical interest in the work which you have in hand.

There is one other matter to which I wish to draw your attention, and that is, labor in the home. It has been our effort, during the past year especially, to induce labor for the household to come from the Old Land to take up domestic service here, and I cannot say that our success has been very great. However, we are not discouraged, and we believe there is great possibility in this direction. We are now engaged in taking up the matter in a more thorough way, and when these people come, I would ask on their behalf that they be treated with that consideration which will make of them better citizens in this new land.

We hope that during your sojourn in Guelph you will make a thorough inspection of the equipment here, and make yourselves conversant with every part of the work. We have in MacDonald Institute an institution which is doing a great work in fitting the daughters of the land for the great and high duties of home making. We are glad, indeed, that you have come out in such large numbers, and we hope that your visit will be pleasant, and that your deliberations may result in lasting good to the welfare of our people.

I shall not trespass upon your time to greater length. On behalf of the Department and the College, I welcome you.

REPLY TO ADDRESS OF WELCOME.

By Miss Agnes Smith, Mount Hamilton.

I have just a few words to say on behalf of the delegates who are assembled here. I thank you for your words of greeting. I think that the Women's Institute, as an organization, is very fortunate in the position which it occupies. The President of this College is, as you all know, deeply interested in this movement. We are really the child of his imagination. And we have those at headquarters who give a very warm support to our work. The able Superintendent at this present time has shown himself as having the interests of our organization much at heart.

I think we are all glad to come to this Institution whenever we get the opportunity. We look to it for two things in our work. We look to it for knowledge as to practical methods for our everyday life.

In the matter of labor saving devices for the home, we always welcome any suggestions of this kind. We also look to McDonald Institute for scientific helps. We are looking to it for instruction as to reasons for our work. We want to know why we do things. We know how, but why? No one can say that Canadian women are not willing to work, but we want to be intelligent workers. We are looking to this Institution for something else. We are looking for inspiration for our work. None of us have ever reached our ideals. That is what helps us in our work, and we are looking to this Institution for inspiration for higher and better ideals in connection with our home work, and in connection with our Institute work.

Now, I think we have reason to expect all this. We all think that this College is a wonderful place. It is a Mecca toward which we as Institute workers turn our faces. Those who have seen nearly all colleges of this kind, tell us that this is the greatest institution of its kind on the continent, and

I find some who even state that it is the greatest institution of its kind in the world.

I think I voice the sentiments of all present when I again thank the chairman for his words of greeting, and I feel sure that we shall all avail ourselves of the privileges so kindly granted us.

ADDRESS OF SUPERINTENDENT.

GEO. A. PUTNAM.

In reviewing the work of the past year my pleasant duty is made all the more enjoyable by the presence of such a representative gathering as I see before me. From Temiscaming in the North; Renfrew and Dundas in the East; from the extreme West, where, as we heard yesterday, vegetable gardening is taking such an important place; from the fruit sections of the Niagara district, and from the solid counties of the central portion of the Province; from 77 district Institutes, with their more than 300 branches, we have gathered together to-day the Gold of the Province. Although we hear of political corruption, and betrayal of trusts, and fraud in business, we can place every confidence in the stability of the nation, when the best mothers and daughters meet together in such large numbers, with a common object in view,—the betterment of the home and the advancement of the nation,—"For Home and Country."

We have come together not only as students but as teachers, and I am here reminded of a statement made by a noted educationist recently, to the effect that some of the most successful teachers—teachers who impart knowledge which is put to effective application in mature life—are not found in the educational institutions known as public schools, colleges, and universities, but are found in another class of educational institutions known as foundries, workshops, and fields. These instructors are not usually called teachers, but are known as foremen, bosses, master mechanics, etc.; and I believe, sir, that in every Women's Institute, no matter how small in number, will be found women whose practical knowledge and instruction received from their mothers will make them effective teachers in the Institute. The accumulated knowledge which is necessarily acquired in successfully providing for a household, and in the training of children, is more to be prized than bald scientific facts bearing upon household matters; and we wish to impress upon the members of the Women's Institutes that no matter how small the organization concerned, there is within the organization talent and knowledge gained by practical experience and handed down from mother to daughter, which, if systematized and presented to the members, would be of lasting benefit to the community. In the workshops of the farm home, not in the fields and barns, but in the kitchen, living rooms, and parlors are found the teachers upon whom rests the greatest responsibility for the physical, moral, and intellectual betterment of the race.

We have spent thousands, and hundreds of thousands of dollars in this fair Province during the past 20 to 25 years in experimental work, scientific investigation, and teaching, with a view to increasing the productiveness of the soil and the quality of the grain and stock, and it is gratifying to know that the public and Legislature are now awake to the necessity for devoting their energy and money to that education which will enable us to better feed, to better clothe, to better house, and to give better advantages for intellectual advancement to the fathers and mothers, the boys and

girls. If the moneys spent along agricultural lines have been returned to the farmers of the Province ten-fold, and I think this can be demonstrated, then, the moneys which may be devoted to the higher purpose which this organization has in hand, will be returned a hundred-fold; in fact, it is almost sacrilege to estimate in dollars and cents the benefits which will accrue to the coming generation as a result of the work which is being done through the medium of the Women's Institute.

My statements regarding the power within the Institutes themselves to do effective work is not theorizing, for this has been illustrated over and over again in the organizations already established. Examples of this latent power are given daily in the reports received from Institutes throughout the Province. In the Rainy River, Thunder Bay, and Temiscaming district, where Institutes were organized only last summer (and I mention these only to illustrate the work which has been going on for years in the older portions of the Province) monthly meetings of a most enthusiastic and profitable nature are being held. The information imparted by papers, addresses, and discussions in these organizations would do credit to those Institutes which have been established for years and have had the advantage of instruction from persons trained at Domestic Science schools and colleges.

Most of you are probably not aware that we have in all some 35 organizations in the newer parts of the Province, which are at present doing effective work, and branches have been recently established at many other points in the districts referred to and will be doing regular work during the coming season.

I must not forget that I am to make a few statements as to the work which has been done during the past year. You will grant me the liberty of adding thereto some suggestions as to future work.

While the growth during the past year has been most satisfactory, a membership of 10,500 at the end of June, it has not developed as it would have with the assistance of an official organ. We regret that the periodical which was used as a means of inter-communication in 1905 ceased publication early in 1906 and left us without any means of sending periodical Institute news to our members. More or less information regarding the work has appeared in the press from time to time, but there is a sore need at this juncture of some definite means of furnishing regular information to our members. We have, however, during the past year given 10,500 women, who are members of the Institutes, besides thousands who are not members, an opportunity of gathering at their Institute meetings and learning from delegates sent out by the Department, and from members of the local Institutes, that which will be of use to them in their every day routine and planning of work, and in the duties resting upon them as wives, mothers, and sisters. Without giving particulars, I may state that the policy of the Department has been to give assistance to at least one meeting a year for each branch, and further assistance, as circumstances seemed to demand.

I would not for a moment detract from the work done by the scientifically trained Institute worker, nor unduly commend the worker who relies almost entirely upon information gained from practical experience. The greatest efficiency in the Institute work can be attained only where there is proper blending of these two qualifications. We are glad, indeed, that the MacDonald Institute courses lay much stress upon efficiency in practical work. This is as it should be. Many of the organizations throughout the country are asking for more scientific knowledge. They must know the Whys, and the Wherefores and the underlying principles. The natural

result of this must be that we shall have at no very distant date sessions of four or five days, or longer, under the auspices of local Institutes throughout the Province, these sessions to be devoted largely to the study of domestic science in its broadest sense in its practical application to the farm homes. Then we shall see large numbers of those who take advantage of these special sessions coming up to the Macdonald Institute for a still further study. The object of the benefactor who so generously donated Macdonald Hall and Institute to the Province was, I believe, to give the girls of the country an opportunity to receive a scientific and practical training. The Institutes alone will form a constituency which will soon tax the capacity of the Macdonald Institute.

It is, of course, well for us to review the work of the year, not only in the local society, but in the district Institute, and for the whole Province. It is more important, however, that we plan for effective work during the current year and the years to follow. Through the generosity of the Minister of Agriculture, aggressive work on the part of the officers, and good business methods, many of the Institutes now have a considerable balance on hand. Our duty is now to see that a wise use is made of these funds, so that all members may have an equal opportunity of receiving benefit from the same. Many of the Institutes have established libraries. This is a commendable line of work, provided some plan is adopted by which an exact and close record of the books and periodicals can be kept, and that the provision for the circulation of the same is fair and equitable to all concerned.

Then again, some prizes might be offered for a special exhibit in connection with one of the regular meetings or at a local exhibition. The competitions may consist of collections of weeds, flowers, or vegetables collected or grown by the exhibitor; or bread, cake, etc., made by members of the Institute and accompanied by a statement as to the methods employed. An effective means for keeping up an interest, fostering a spirit of friendliness and broadening the work, is to arrange for one local Institute to give the program for a nearby Institute. It would be quite within the province of the Institutes concerned, to bear at least a portion of the travelling expenses of members who thus serve the Institute. The one object to keep in view is how best can we conduct the work in order that all may have the privilege of receiving equal benefits therefrom. Make a special effort to interest the girls of the locality in the Institute. The future of the work will depend largely upon the assistance which may be rendered in the years to come by the school children of to-day. As you are well aware, much now is being done through the public schools to create an interest in household and agricultural matters. The result of this must be, if such work is carried on effectively, that the girls will take more interest in the Women's Institute, and the boys will take a keener interest in the farming operations as the years progress. We sometimes hear it stated with reference to Farmers' Institute work that the immediate future success of the same depends upon the interest which we are able to create and the good which we can do among the boys and young men of the farm. We are introducing judging classes and illustrative material, in order that this may be attained, and it is to be hoped that the officers of the Women's Institutes will not fail to do what they can to interest the girls in home-making and housekeeping.

Now that we have the consent and support of the Department to get out periodicial information which can be used by Institute Officers and members as a basis for their meetings from month to month, we see no reason

why the officers of all Institutes should not be able, with very little exertion on their part, to conduct regular meetings with lasting benefit to their members. It is true that any series of bulletins or lessons which may be issued will not be used by all the Institutes, for the reason that a number of the older organizations have given at least some attention to almost any topic which might be suggested along home-making lines. These Institutes, we are sure, from the resourcefulness already displayed, will be able to select such as will best suit their purpose and add to the same, as occasion may require. We are rich, in that our farm journals, weekly papers, and even some of the daily papers, devote considerable space to "Home Departments." Then, again, there are a number of special journals, which are published solely for the benefit of the ladies. With the facilities at hand, so far as literature of various kinds is concerned, and with such an enthusiastic and faithful band of officers, the future of the work is assured. We regret to report that some of the societies organized in the past years have ceased work. This number, however, is surprisingly small, and in the great majority of instances, in nine out of every ten, where it has been decided to disband, the officers or some of the members have expressed a desire that re-organization be effected at some future date. We are firmly convinced that the success of the work depends more upon the efficiency and enthusiasm of the local officers than upon any other one condition. The greatest success, however, will result when officers, the publishers, of our many magazines and papers and the Department, fully appreciate the unlimited field for bettering the conditions of the homes throughout the rural districts and villages of the Province, and work in harmony towards that end.

We beg of you to remember that while each must perform the duty next her, she should be encouraged by the knowledge that there are 10,500 others who have a common interest in keeping always before them the welfare, in the highest sense of the term, of the home and the individuals therein.

The Women's Institute has made little, if any, change in the ideals of its individually excellent members, but its strength lies in consolidating these ideals into a force which will make for the advancement of Home and Country.

It is to the officers of the Institute, and the large number of faithful workers which they represent that we look for the successful carrying on of this work. I beg to add my welcome to that of the Hon. Minister of Agriculture, and to bid you God-Speed. The Convention is yours, and I know that you will individually give and take all the good possible while here.

PREVENTION AND TREATMENT OF TUBERCULOSIS.

By C. A. Hodgetts, M.D., Toronto, Chief Health Officer of Ontario, etc.

In the popular mind tuberculosis and consumption are one and the same disease; this, however, is not the case. One may suffer from tuberculosis and yet not be a consumptive; while on the other hand a consumptive person has tuberculosis. In other words, a tubercular person becomes a consumptive when he begins to spit and discharge tubercular matter.

It is generally supposed that a sufferer from tuberculosis will inevitably die of consumption; such is not the case, for undoubtedly "Tuberculosis exists in the world to a much greater degree than the manifestations of consumption would indicate." Many cases of tuberculosis end in recovery without being detected. Many persons suffering from tuberculosis die from some other disease without the existence of tuberculosis ever being suspected.

This fact is being confirmed by those of the medical profession who make autopsies, *i.e.*, examine dead bodies to study the effect of disease upon the human system. These investigations show that nearly everyone, certainly those in the lower walks of life, have had tuberculosis in a greater or lesser degree at one time or another.

Any part of the body may be attacked by tuberculosis, the skin, the eyes, the ears, the mucuous membrane, the bones, the abdominal organs, but more commonly the lungs.

The disease of these particular parts are not spoken of as tuberculosis, but we hear of scrofula, lupus, white swelling, disease of the spine, hip joint disease, and many other chronic or long standing diseases, all the result of tuberculosis.

Dr. Flick of the Phipps Institute, Philadelphia, writing in this connection, says,—

"Our insane asylums, orphan asylums, almshouses, houses of refuge, reformatories, prisons, and penitentiaries, shelter the indirect result of *tuberculosis*."

Note well he does not say *consumption*.

That you may the better grasp the difference between tuberculosis and consumption, I would have you briefly consider *three micro-organisms*, germs, microbes or bacteria, whichever you like to call them,—

1. *Tubercle bacillus*. 2. *Streptococcus*. 3. *Staphylococcus*.

Now tuberculosis is caused by the growth in some part of the human system of No. 1. only. It is micro-organism which, by itself, does very little harm, and as I have said before, rarely, of itself, causes death.

But why you ask, do not all cases of tuberculosis become cases of consumption. Well I will briefly explain. Upon the tubercle bacillus gaining access to the system, which it does either by the skin, through the digestive passages or through the air passages, it is conveyed to more distant portions of the body by either the blood vessels or the lymphatic vessels, and finds a home in one of the tissues. As soon as this takes place the white corpuscles of the blood, the phagocytes (microbe eaters), the police cells of the human system, which are on the look out for microbes, pursue them most relentlessly, waging a most bitter struggle with the invaders, the tubercle bacilli.

This struggle is constant and remorseless in character, the tubercle bacilli throw out poisonous toxins which kill the police, and the police in turn secrete fluids which either diminish the vitality of the bacilli, dissolve them, or the fluid becoming hard around them, walls the bacteria up, thus—the struggle goes on; if the police are strong, the bacilli are overcome, but should the victory be with the invaders, localized death of the tissues takes place.

It is just at this interesting point, this victory of the tubercle bacilli over nature's police force, that the other two microbes come in; up to this time the Waterloo of disease has been between the microbe eaters and the tubercle bacteria. The streptococci and the staphylococci arriving at this critical moment form a union of forces, nature's vanguard (the white blood corpuscles) gives way and consumption begins. Without the presence of the streptococci and the staphylococci, the tubercle bacilli would, although victorious, soon become extinct. For these two auxiliary forces destroy the surrounding tissue cells and thus form coverings for the tubercle bacilli

enveloped in which they pass through their broken-down tissue walls within which they originally found a home, before beginning the battle just pictured.

This victorious battle consummated by the union of the three forces of microbes when it takes place in the lungs is the beginning of consumption.

This first struggle, as a rule, gives rise to constitutional symptoms so slight as not to attract attention, but the victorious triumvirate follow up their first and hard fought victory, the tubercle baccilli make the way for the streptococci and the staphylococci, for they cannot live on normal tissue, and require their tubercle allies to precede them in the destructive process.

When once, however, this condition of affairs takes place there are unfortunately other micro-organisms which assist in the destructive work, such as the influenza bacillus and the pneumococcus, which act by reducing the vital resisting force of the human system. They disarm many of the microbic eaters, the white corpuscles, and in this manner the progress of consumption is accelerated.

Before discussing the measures to be adopted for the prevention of tuberculosis, I would direct your attention very briefly to one of the popular fallacies regarding its cause, viz., Heredity.

If by this expression you mean to place it in the same category as physical form, traits of character, color of hair, then the answer is positively *No*, it is not a cause; but if you imply that exceptional condition of a mother conveying the tubercle bacillus to her offspring whereby it becomes imbedded in the body during the earliest developmental stage, then the reply is *Yes*.

In the majority of cases, however, where it is found to be a family disease where, for instance, whole families become its victims, or father and son and grandson get it, the cause for this is not difficult to locate. An implantation of the tubercle bacillus has occurred, while residing in the home of a consumptive ancestor, possibly in infancy, but, owing to the resistance on the part of the son or grandson, this has not asserted itself until later life is reached, when through lessened power of resistance on their part the Waterloo takes place; this is very clearly put by Dr. Flick, thus—

"Consumption is a family disease on account of the life history of the tubercle bacillus rather than of heredity. The disease clings to families for generations because the conditions for implantation and growth of the bacillus and for the completion of its cycle of life exists best in the family, and the bacillus may lie in houses, as wheat in a granary, for generations. Then, too, consumption in a family helps to produce soil for the tubercle bacillus in other members through the hardships, want and sorrow which it begets."

And digressing again, I wish to say a few words on what, in my mind, has been too strongly advanced as a cause, and a very serious cause of tubercular infection, viz., the danger of street infection from tubercular sputum. You are all familiar with the hideous picture given by public speakers of what you and I have almost been led to believe is a hydra-headed monster, unseen, but present in every cloud of dust and puff of wind. Now carefully consider the facts, do not be led astray by arithmetical calculations, such as the following—a particle of tubercular sputum the size of a pin head contains *millions* of the deadly bacilli, and a consumptive often ejects *pints* of this material each twenty-four hours, hence there are millions upon millions of tubercle bacilli in the air, in fact, the little fellows are omnipresent in our streets. Is this theoretical statement correct in practice? I believe not, for the following reasons,—the number of (contagious) consumptives who walk the streets of any town or city is very small. It has been esti-

mated that in the large cities it averages one to every 300 people, or one in each block. The amount of sputum expectorated by such an individual while on the street is of little account in such an area. It is also very questionable whether such a person can produce a fertile environment out of doors.

Again, tubercle bacilli cannot readily accumulate outdoors, because of the constant and rapid processes of disintegration and devitalization which go on.

The tubercle bacilli does not exist everywhere out doors, and when it does it is in the gross, and in comparatively few places.

Just consider for a moment what happens when tubercular sputum is ejected out doors. Immediately it is acted upon by the air, the sunshine and the rain, the latter washes off the covering of the bacillus, when the poor little thing has to struggle for existence against the sunshine and fresh air, and recent experiments show that devitalization of the tubercle bacillus takes place in the sunlight out of doors in from ten to twenty minutes or even less.

We have already shown how dormant and inactive it may remain within the human system; what shall be said then of its chances when alone on the street with no one streptococcus or staphytococcus to come to its aid?

I would not have you think me disparaging the "anti-spitting movement." It has its virtues, but they are chiefly æsthetic; and I would warn against those who inflame the public mind and preach the ubiquity of the tubercle bacillus as the result of expectoration of consumptives in our streets, and upon the acceptance of this gospel stake the salvation of humanity from the "white plague."

Again, digressing, I wish to combat another unfortunate idea which so largely prevails in the public mind, and possibly to some extent in the minds of some medical men. Consumption is classed with measles, smallpox, scarlatina and other of the great class of communicable diseases, hence people shun a consumptive as they would a case of smallpox, and when health authorities ask for a notification of all cases of consumption there is associated with this by the public the placarding of their homes. This is incorrect, and, the sooner that idea is dispelled from the public mind, the sooner will be accomplished much in the direction of notification notification private and confidential to the medical officer of health.

Communicable Diseases.

Contagious.	*Infectious.*
The micro-organism goes directly from one host to another.	The micro-organisms have two kinds of hosts, pass from one to another.
The two persons are close together.	The two persons may be miles apart.
Measles.	Malaria.
Smallpox.	Yellow Fever.
Scarlatina.	Typhoid.
Tuberculosis.	

We see here that tuberculosis is a *contagious disease;* it is only conveyed by contact in either of the three following ways:

(*a*) Contact with the person.

(*b*) Contact with the place occupied by the consumptive.

(*c*) Contact with a thing used by a consumptive.

Out of every nine cases, six contract it by method (*a*), two by method (*b*), and one by method (*c*).

That there may be no misunderstanding as to the grouping of measles, smallpox and scarlatina with tuberculosis, a few words of explanation are perhaps necessary. The first three diseases are rapid in action and intense in form, and the contagium is given off from the entire body and momentary contact is sufficient for the contracting of either disease; whereas, in tuberculosis the contact must be intimate and prolonged and the contagium only given off from one part of the body.

Again, in smallpox, measles and scarlatina, it is impossible to collect and sterilize all the matter given off, and make patients suffering therefrom inocuous to others, without quarantine and isolation; whereas, in consumption every particle containing the tubercle bacillus can be collected and sterilized, the patient being thereby rendered harmless to others of the same household, *without isolation*.

Having shown that consumption is a contagious disease, one spread by contact mainly with the person affected and that by the matter given off from one portion of the body only, and, further, having indicated that every particle of the emanation can be collected and destroyed, we have very materially lessened the methods of prevention to be adopted.

How, or in what way is a consumptive a menace to those persons coming in contact with him? In discussing this we will confine ourselves to that form which affects the lungs.

The contagiousness depends upon the habits of the person. A careful consumptive, that is, one who is clean in person, keeping his clothing free from blemishes, and who is careful as to expectorations and coughing and sneezing, is practically harmless. It is only "In proportion as he is careless and uncleanly that he becomes dangerous."

The use of the handkerchief, or rags or bits of lint and their careless handling.

The soiling of the hands, moustache, whiskers and lips.

The soiling of bed linen and bed clothes with tubercular matter, and the smearing of clothing.

The above are all means by which the disease may be spread, and it must be noted particularly that rooms and houses may readily become contaminated by the careless habits as just outlined, and I am of the opinion that these are more important factors in the spread of the disease than the contagium from the person of the patient himself, for it diminishes in proportion to the distance from the patient's person and in ratio to the distance from his head.

It is the *carelessness* in the past which has been the main factor in the widespread character of tuberculosis, not only the carelessness of the patient himself, but of all those in any way associated with him, and, as this carelessness has been most marked in his own home, it has been called a "House Disease," for while many of the factors due to carelessness may very properly be considered in respect to the consumptive in his daily walks of life and the danger to those with whom he comes in contact in the workshops, the store, the office, the hotel, the boarding-house, the school-room, the church and the public conveyance, yet it is in the house where the greatest aggregation of dangers exist, and to consider these will suffice to indicate those which occur in the other places just named, though to perhaps a lesser degree.

The house is well constituted as a breeding ground, for tubercular matter gets upon the walls, furniture, carpets and hangings and retains its vitality for a much longer period than it does out of doors on account of the absence of sunlight and fresh air; particularly are these unsanitary conditions noted in the homes of the poor in our cities, and in the rural districts when too often the houses are built upon damp or porous soil without any possibility of ventilation between the ground floor and the earth. This is especially noticeable in the case of the Indian, who, when he constructs his house, builds it directly on the damp ground, which, if he were living his nomadic life, his instinct would lead him to avoid as a place for his tepee; a condition which I observed a few weeks ago at Fort William, where the white man in his progress of civilization had driven him from the higher land on the bank of the Kaministiqua River and allotted him a place in which the railroad magnates would not live on any account, and yet we cry alas! the poor Indian! and we assist in his slow and murderous eradication.

While these unsanitary conditions inhibit the destruction of the daily accumulation of tubercle bacilli in the house, they also favor their development in the individual by reducing his vitality.

In winter time the unsanitary conditions of the home are intensified. We clap on double door and windows and the air being re-breathed becomes vitiated and the stoves draw the ground air from the polluted soil beneath.

Then, again, into the house of the wealthy often comes the consumptive domestic, who, if she is a nurse maid, comes daily in closer contact with the children with whom she eats and sleeps and whom she feeds and caresses. If the domestic's duties are those of chambermaid she may contaminate the bedroom. If the cook is affected, the kitchen and the food she handles become centres of contagion. And the danger from domestics is enhanced by reason of their concealment of the fact that they are sufferers, in order to retain their positions.

While not following perhaps the exact outline of my subject as laid down in the programme, yet, I have desired to draw your attention to some points in the consideration of tuberculosis, and particularly consumption, which, if carefully thought over, will lead you to understand what points have to be taken into account in preventing the spread of this scourge of civilization, and will leave with you the two pamphlets issued by the Provincial Board of Health, setting forth in one the precautions to be taken by the individual, and in the other the general precautions to be observed.

In addition to the preventative measures therein set forth I desire to emphasize the fact of the necessity, the urgent and great necessity which exists for the adoption in this Province of a system of confidential notification to local Medical Officers of Health, of all cases of consumption, in order to permit of the adoption of those measures which will ensure the early institution by the patient and those of the same household of those measures set forth in the pamphlets, and also to allow of a disinfection of all houses in which consumptives have resided or places in which they have been employed.

Without a measure of this kind we can never hope for much advance along preventative lines, of course. The public must be prepared to acknowledge the service rendered to the community by the medical profession in this matter, by a fee for each case notified, on the principle adopted in Great Britain. The service is for the public good and should be so considered.

It has recently been asked in the public press, what have health authorities to do with the treatment of the tuberculous that is being attended to by

charity and the medical profession; prevention is the sphere in which we should work. My answer to this is: The greatest work of preventative medicine in respect to tuberculosis lies in directing the scientific treatment of the sufferers. I would as well conceive of smallpox and diphtheria being successfully handled by a charity association as I have hopes of the fulfilment of our highest expectations in the successful eradication of tuberculosis, by the act of charity alone.

In directing the cure, health authorities are preventing the spread of the scourge, and this branch of medicine should lead and direct in what lines charity may successfully work in; to assist the poor and needy, for the work is great and all must render assistance, but the state and the municipality must have the guiding hand. To leave the treatment of the consumptive in the hands of charity alone is wrong in principle and, however well done, cannot be entirely satisfactory.

I would preface my remarks on treatment by stating that tuberculosis is one of the most curable of diseases; indeed the tendency to this end is so great that often without medical aid and without any regard to the common laws of hygiene more cases recover than end fatally. Amongst the poor in large cities Dr. Flick says "nearly every one gets tuberculosis and one-third of all who get it die of it."

Further than this, there are now to be found many living examples of cured *consumption*, those in whom the diagnosis had been scientifically established. In the incipient stage, the majority of cases can be cured without leaving home or giving up employment; and, even in more advanced cases, a majority can be cured if proper conditions for their treatment for a sufficiently prolonged period are adopted.

Whatever line of treatment is followed, they all seek to restore the human organism to normal physiological action. It is not so much a matter of medication by drugs, as it is the regulating of the patient's life. Drugs, however, have their place in regulating the abnormal action of disturbed organs, restoring them to normal functions. The treatment hinges mainly on a sufficient amount of proper food, upon regulated rest and exercise and fresh air.

Without entering into the physiological reasons for the selection of a line of dietary, it is found that the following are the best foods for the tuberculous,—

1. Milk. 2. Eggs. 3. Meat. 4. Fresh vegetables and fruit. 5. Nuts.

And the food should be given somewhat along these lines. One meal of solid food a day, preferably at mid-day or in the evening, supplementing this by milk, eggs, fruit and nuts during the day. But the physician must regulate the dietary to suit the idiosyncrasies of his patient.

The next remedy is, Fresh Air, that is, *outdoor* air not *indoor* air, fresh air day and night; it is the OUTDOOR LIFE SLEEPING AND WAKING, with all the sunlight possible: never mind draughts if the patient is properly protected. You ask me what outdoor air? My answer is, It is good anywhere. Outdoor city air is good, but outdoor country air is more free from smoke and dust. The altitude, whether sea or mountain, depends upon certain conditions of the patient and must be prescribed by the physician, and the same must be said of rest and exercise, both of which, however, must be taken in the fresh air, and so long as febrile symptoms are present rest must be absolute. Exercise must ever be within the bounds of fatigue, whether it be deep breathing, massage, carriage driving, horseback riding, walking, or more severe physical exertion.

A few words as to the best means of rendering aid to the tuberculous. It is by the association of the dispensary, the day camp, the sanatorium and the hospital. The former with its staff of physicians and visiting nurses are of invaluable aid to those in the early stages by giving food, medicine, spit cups, paper napkins and bags, and in educating the consumptive how to live and regulate his life. To those in the more advanced stages of the disease, the sanatorium is the proper place, certainly for the poor, for here he is trained to correct his habits and methods and is brought back to health. The sanatorium patient graduates a useful citizen, knowing how to take care of himself and how to protect those with whom he associates.

For the unfortunate incurable, the hospital is a Godsend both to himself and to those of his family. It is at this stage he is most certain to contaminate the house, and the danger to others is the greatest. Removal to an hospital, therefore, minimizes the danger to others and enables his last days to be spent under the tender care of trained nurses who will smooth his pillow and ease his pain.

In conclusion, I am of the opinion that municipalities should do all in their power to establish such institutions. The people have unfortunately not as yet learned the economic value of health and the great loss incurred annually by the ravages of tuberculosis, and as a result have been very reluctant to spend money along these lines, but I am hopeful, for with the education will come the full sense of an appreciation of their duty, and these good, these necessary things will come, and with it increased Government aid, to those municipalities who rise to the responsibilities now resting, now pressing upon them.

ADDRESS.

By Miss I. Rife, Hespeler.

This subject which has been taken up by Dr. Hodgetts is one that ought to demand our most earnest attention and thought, especially those of us who are Institute workers, and those of us who say we are the home-makers of Ontario.

What I have been asked to bring before you this afternoon is, "What may we, as members of Women's Institutes do in fighting the great White Plague"? Now I am sure that if we realize the danger of this disease, we will be anxious to do what we can. In March of this year I had the privilege of attending the Convention of the Canadian Association for the Prevention of Tuberculosis, held in Ottawa, and I am sorry to say that I was the only lady delegate present. To my mind, it is a very great mistake that this organization is composed wholly of men. There were many physicians in attendance, but the women of Ontario ought to be represented at this Convention which has for its object the fighting of this disease. I hope that, before the close of our meeting to-day, we will express our desire to co-operate with the Dominion Association. I also hope that you will show your interest in this subject by making it one of special study during the coming year. Let us study this question and become more familiar with it. The trouble is that most of us are afraid of it. It is a great and interesting subject and it would pay us to look into the matter most thoroughly. If you wish to purchase literature, it will not cost you much. If you wish to get it free, you can. You can secure pamphlets by addressing the Rev.

Wm. Moore, Ottawa, Secretary of the Dominion Association for the Prevention of Tuberculosis.

Just a word as to sanitarium treatment. If you consider a moment, you will realize that, after all, our hospitals and sanitariums cannot begin to treat the cases of tuberculosis which exist in our land, and therefore, it is necessary that we undertake a similar home treatment of this disease. Sanitarium treatment has proved very, very good, and has demonstrated that it is capable of not only preventing consumption, but of curing it. Through this treatment a very great deal of useful information has been spread throughout the country and has gone to different parts of our land, and so with this information we, as a people, are becoming more and more enlightened along this line. Now I claim that the average man, woman or child is capable of understanding the main points in regard to the treatment of consumption. This disease has been unsuccessfully treated in the home for the reason that we do not know how to go about the treatment. If sanitarium treatment can cure, why not use it in the prevention of disease.

If you followed Dr. Hodgetts closely, you will have noticed that he laid great stress upon fresh air, good food and rest.

Have we considered this subject at all in our Institute meetings? We have the regular round, cooking, sewing, etc. We waste a good deal of valuable time in discussing puddings and salads. Now do not mistake me. These have their place, but, in regard to these things, let us learn the few general principles and then use our common sense to help us out. Let us, in the study of food subjects, consider the consumptive, and, if we have food that is good and wholesome for the consumptive, it will be good for any person.

Then with reference to rest, this is one of the great fundamental principles of cure. If rest is so important for cure, it must be in the prevention of the disease, and is important for us who live in this great work-a-day world. We might take up this subject of rest cure in our Institute meetings. Look at it from every side, not only with regard to the consumptive, but also in regard to the development of womanhood. Just a word in regard to exercise. Why should we not know how to turn our ordinary household work to good account, and apply our knowledge so that it may count for something in the development of our bodies.

Then there is the subject of heredity. What more interesting topic could we have? We certainly inherit failures of past year, both physically and morally. Let us find out these weaknesses and, as far as possible, correct them for the generations to come.

During the coming year, let us make a special study of this subject which has been brought before us to-day, and we will consider that much good has been accomplished for all time to come.

RESOLUTION REGARDING AFFILIATION WITH CANADIAN ASSOCIATION FOR THE PREVENTION OF CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

Dr. Hodgetts: I am not here as a representative of the Canadian Association for the Prevention of Consumption. I may state, however, that this Association is a body composed of certain persons who are interested in the prevention of tuberculosis. This Association meets only in the City of Ottawa. It has received aid from the Dominion Government in the distribution of literature. The idea of the Association is simply to educate the

people of this Dominion as to the treatment of tuberculosis along the lines which I have just suggested. The Association would, I am sure, appreciate it very much if the women of this Province would become affiliated and show a practical interest in this work.

"Resolved, that this Convention of Women's Institutes desires to express its sympathy with the work of the Canadian Association for the Prevention of Consumption and other forms of Tuberculosis, and hereby makes application to the Council for affiliation with the Association." Carried.

Mr. PUTNAM: Last summer when we held our regular series of meetings, we arranged with Dr. Moore of Ottawa to send literature to each place of meeting. I think nearly all Institutes have Dr. Moore's address, and can get additional literature by writing him. It would be well for us to affiliate, but, even though we do not, we can carry on this important work which I think should receive the attention of all our members throughout the Province.

LABOR SAVING DEVICES.

MISS M. U. WATSON, MCDONALD INSTITUTE, GUELPH.

I am taking it for granted that my audience this afternoon is composed chiefly of women who do their own work. I want to rule out women who take no interest in the process of home-making. There are any quantity of such in Canada. I also want to rule out women who are wealthy enough to hand the work over to the housekeeper and well trained servants, but their number is so small that we need not worry about them.

Now there are various factors in this business of labor saving. First, there is the housewife herself. She is the operator. Then there is the house—the field of operation, and finally, there are the means employed to save labor. I want to take these up one after the other.

You will agree with me that the housewife herself may be the finest labor saving device in the world. The first requisite is a sound body. Now, if your parents did not do their duty and present you with a sound constitution, I am sorry. If they did, you are exceedingly fortunate. If not, you are going under the old, old law, and probably exemplify the fact that the sins of the fathers and mothers always are visited upon their children unto the third and fourth generations. Therefore we must be careful. We cannot change ourselves, but we can at least check the downward tendency and we can take wise care of these bodies of ours. The uplift of the coming generation rests with the women of the present generation, and mothers and fathers of the present generation. Our interest is chiefly with the mothers, but remember that I wish to include the fathers in all these questions of authority.

To come back to our theme, we want a sound body, and we must take care of it. We want to protect it from every harm. In the first place you must cultivate good habits. You must learn to use your muscles properly, and therefore more easily. When we have well trained, sound, hard muscles which can do anything that is required of them we will find them splendid labor saving devices. You must cure bad habits. If you have the habit of standing on your heels, you can get out of it. Nothing is more tiresome. Learn to stand on the balls of your feet. Also, when you sit down to work,

sit on the end of your back bone, not on the middle of it. You will find that you actually think better when you sit properly and stand properly. You may, then, put down a "straight back" as a labor saving device. If you have not a sound body, go to work and improve it as far as you can.

The next point to which I wish to refer is the attitude of the housewife toward necessary labor, the actual labor of the house. If you take a whole-souled interest in your work, you will get along much better, and you will do it more easily. We all know the woman who spells duty with a capital "D." She is often a very capable woman, but, unfortunately, she pats herself on the back and says, "Do you see how longsuffering I am?" She is unpleasant to live with. If we were to tackle our work with more vim and push, it would be easier for us. Now remember that I am not saying that a great many women do not do it. I am talking of the women who find it hard, and who have not yet seen that anything that has to be done is worth doing to the very best of our ability, and that, if we keep our mind occupied and not think of the unpleasantness of it all the time, that the work will not be so hard after all.

Now there is another and a very wide field in which we may consider this business of labor, and that is the eliminating of the non-essential. Now it may be that there are but a few women who think that labor is duty spelled with a capital 'D,' but I do know that I am safe in saying that there is an enormous number who are doing far too much non-essential labor. I refer to the things and the care of things which we can do without, which cost more than we can afford to pay, either in time, money or muscles. We know there are women who are doing this. Remember that when you begin to rule out the non-essentials you will be doing without many things which at present you think you must have. You will find it the finest lesson in temperance that you have ever had, and if you will apply it to your house furnishings you may have to rule out many things that are there now, many things that simply make work. Apply this to your housework, the actual operations of the household, and you will recognize that the house with only one pair of hands to do most of the work in it cannot afford to have the same waiting upon its individual members that that house can which has four or five servants. There is too much of this in this country. Let us get away from it. Let us realize that the household with one pair of hands to do the indoor work must get away from a great many things.

This temperance also applies to dress. We all know the woman whose desire seems to be to have clothes which must be at least as good as her neighbors, just as many tucks and as many frills. Now, if you have time, I have no objection to tucks and frills all over, provided you like them. If you have not time, you have no business to indulge in them. Cleanliness is most important, and it is sufficiently hard work to keep clean, without putting on extra things which have to be kept clean also.

Then this temperance may be applied to cooking. We do too much cooking, altogether too much for the hands which have too much work to do. One person cannot cook meals of many courses. It is not necessary that we have meals of only one course three times a day, but certainly we can get along with less cooking.

Temperance applied to the household means to simplify,—to simplify everything that we can. You will be happier and, I am sure, healthier, when you begin to act along this line. You will find that you are cultivating that alert judgment which makes you quick to recognize a labor saving device when you do see it, whether it be an improved method or a new one.

You will also be cultivating a quick judgment which can decide in most cases whether, or not, the new is worth trying. There are many things which you think worth trying, but which may prove to be the cause of more work than is saved. But you will develop judgment the more you exercise it in this line. After you have determined then to eliminate the non-essentials, watch for labor saving devices.

You are to plan for your work. Now the architect makes his plans for his building before the builder lays a stone; he makes that plan as carefully as he can. He exercises all the faculties which he possesses to make it just the best. By and by we hope to get the average architect with his eye on the labor saving side. If you would take a course in business, you will find that the best salesman is the man who thinks out how the work shall be done, how to keep the wheels running and keep them running together. If the housewife would take this hint and make her plans before she begins the work of the day, or for the month or year, she will find that one of the greatest labor saving devices. It will prevent confusion. It will prevent over-lapping, and it will facilitate labor. If she has not thought the work out carefully, how can she direct another? You will also find that the woman who has well thought out the plan for the day's work is the woman who can always change her plans quickly if something turns up unexpectedly. So much for the housewife.

Now for the house. I am not an architect, although much interested in the subject as it has to do with homemakers. I would like to know how many of my audience have ever sat down and considered their homes from the labor-saving standard, have gone carefully over it, room by room, with "labor-saving" written on the mind's eye. Have you ever considered whether the arrangement of the rooms was not making work and whether the arrangement of the rooms might not be changed so as to save many steps; whether the conveniences which you have there will cause you work or save your steps? How many kitchens have a step down into them from the diningroom, and steps down to the ground outside? If you think of the number of times which these steps have to be travelled over, even in a small house, you will try to eliminate these unnecessary steps.

How many of your homes lack the small inexpensive conveniences which help so much to lighten the work! Have you ever considered what would be necessary to make the house you live in much easier to work in. The farmer is not slow to learn that he ought to buy machinery. He is learning that it is profitable for him to have water pumped into the barns; that it will save money if he will save his steps. Now, how many of us are willing to ask for these necessary things for the household and are willing to spend the money for them? Many houses lack labor saving devices because the housewife does not ask for them, does not demand them. These things will wear out, of course, but so do the reaper and the mower. How many of your women are using the same old iron pot that your grandmother had before you—not the same pot exactly, but one like it. The farmer is not using the same plow that was used years ago. Now, why should you not get your labor saving devices in the kitchen, even though they cost as much as the new reaper or the new mower? How many of you are asking for water taps in the kitchen, and how many are still carrying hard and soft water from the barn? Determine to have these labor saving devices and you can get them, because it is a well known fact that, when a woman makes up her mind that she is going to have a thing, in nine cases out of ten she gets it.

Then so many of us are doing things a certain way because our mothers and grandmothers did them that way before us. Housework is about the most conservative work in the laboring field. See if there are not many ways in which you might save time, and remember that time saved and steps saved are money saved.

How many of you are getting rid of the superfluous furniture and bric-a-brac, things that have no connection with your homes, but some one has given them to you, or you have made them in your younger days and you like to look at them, and the materials were too good to throw away. Let us learn from the Japanese. If you have many beautiful things, do not put them all in one room and keep them in sight all the time. Rather, put out one or two of them and enjoy them. Then put those away and bring out others and enjoy them for a time. Unfortunately many of us like our things in sight just to see that we have them. When you are thinking over this question of non-essentials, please keep your eye upon the superfluous furniture and bric-a-brac. But I cannot advise you to give it away, because you might give it to some one who might not need it any more than you do yourself.

I have theories in regard to building which I wish to give. In these late days you can get books and magazines, and now that photography is such a fine art, you can get illustrations of well planned houses. Study these and you will find many suggestions. Have an architect who knows something about building; you will find that it will save you money and prevent your making a mistake, but, after you have your architect's plan, live with it. Imagine yourself living in it. Learn to read the plan so that you can decide whether or not certain parts are going to be convenient places to work in. Watch your architect when he makes his plans, and particularly watch the tenders. Lay down one law, and that to have your woodwork plain. Have it as well made as you can afford, but have it plain. Remember the dusters that have to come in contact with it day after day, year after year. Rule out dust-gathering crevices. The simple plan is the artistic one. If you are going to have plumbing, watch your plumber, particularly in the kitchen, because plumbers are very fixed in their ideas. Remember that the general rule for the sink is to have the bottom part just high enough to reach the tips of the fingers. If you will think of all the sinks of your acquaintance you will find that very few of them have that measurement.

Now to come to the means employed for labor saving. With regard to methods, every household has methods of its own, but, if you find that some one else has a quicker and better method, adopt it. Do not hesitate to give up the old if you find a better. Study how your husband works out this theory in his work on the farm and in business. Those who run the business machinery of this country are constantly seeking out ways by which they may lessen the time used for the accomplishment of work. Do not be afraid to try something new that no one else has tried. Read your books and magazines along this line, and you will find many helps.

Now for the utensils used. The first one that I want to speak of is the dress. There is great moral support in being well dressed. We feel better when we know that we are dressed suitably and when we know that we look well. If we have the work to do, we might as well look attractive while we are doing it. I do not think it will cost you much more labor to dress suitably than to dress unsuitably. I am going to show you a dress which we have adopted at MacDonald Institute as being a suitable one for kitchen work. It is made in two pieces and is pefectly plain, because it has to be laundered. The sleeves are short and a tie is worn with the low turn-

down collar. We prefer a white tie, because it looks nice, and, as we have said, we might as well look nice. It may be made of any material that is suitable. We also have a laundry apron, for we believe in dressing for laundry work. It is simply an apron which covers the whole dress, and is buttoned down the back.

There are many so-called labor saving devices on the market. I want to warn you against many of them, for they require more work to use them and keep them clean than they save.

I want to ask how many of you have the small kitchen conveniences, such as meat grinders, stoners, egg beaters, etc. How many have linoleum on your kitchen floor? The work of keeping it clean is so much less than keeping the old pine floor clean, and the latter is only nice when it is clean. Linoleum does not stay clean, but it requires so little time to keep it so. How many of your women have a rolling table in your kitchen? How many have hot and cold water in the kitchen? Do you know that it would not cost you as much to outfit your house with a bath room and hot and cold water taps in the kitchen, with the necessary sewage pipes, than it used to cost your husband to get a new binder? Why should you not have these things? There is no greater labor-saving device in the house than a bath room and hot and cold water in the kitchen, and, if you can have water in the barn, you ought to be able to have it in the kitchen. How many have used the dusting mitten, or, rather, how many of you have bruised your fingers trying to get around the panels? This mitten is made of sheepskin and is dampened with kerosene. How many have washing machines? I believe there are five hundred different makes of them on the market, but have one anyway. How many of you have a mangle? I want you to examine the two piles of napery on this table. Each pile contains the same number of pieces. One took forty minutes to do, and the other took one and three-quarters hours and the standing over a hot iron.

The finest labor saving device which the housewife has is a well trained son or a well trained daughter. Train your boys and girls to help you. Let all pull together.

The best labor saving device in the world is the woman who is master of the situation. Are you master of the situation in your own household? If not, why not? It is high time you set about it.

MODERN METHODS OF CHILD SAVING.

By J. J. Kelso, Toronto, Supt. for Ontario of Neglected and Dependent Children.

There has been a great awakening in recent years to the rights of children as future citizens and especially to the right of the neglected child to some measure of sympathy and protection on the part of good people. It is only fourteen years since a law was passed in this Province for the better protection of neglected and dependent children, and it is hard to belive that prior to that time there was no legal machinery in existence whereby a child could be taken away from the control of drunken and immoral people. There were many benevolent societies in existence but they could only operate by moral suasion and were quite helpless to reach a large class of children who were being brought up under the most baneful influences. At the same time there was ample machinery for the conviction and punishment of the

child who, through this evil home training, began at ten or twelve years of age to pilfer or in some other way show the effects of its earlier education. There were police officers, courts, reformatories and jails, but no way of effectively helping and protecting the child from getting into these undesirable institutions. Now, it is becoming increasingly recognized that boys and girls can be influenced and helped by love and sympathy and firm but kindly supervision and that, if we are to save young people from continuing in wrong-doing, we must invite the co-operation of philanthropic people everywhere, rather than look to the policeman and the prison for relief. It is well to remember also that criminal law falls most heavily on the children of the poor, upon the motherless boy or the child of the drunkard driven to crime by lack of education, through hunger and deprivation or, it may be, by the direct request of those who should help them to do better. By imprisoning such children they are doubly wronged and society but aggravates in the youthful heart the sense of injustice which, by breeding a revengeful spirit, is sure sooner or later to bring retribution. Law will do much but after all it is the person and loving intervention of some kindly disposed person that will draw out the good that is in the youthful heart, and by awakening the ambition to excel, encourage the offender to avoid further trouble.

In Ontario the Children's Protection Act encourages the formation of Children's Aid Societies and Committees in all parts of the Province. These are entirely managed and maintained locally but are given encouragement and advice from the central office at Toronto. There are at the present time fifty-six of these Societies, in addition to a large number of small committees, and they are doing a great work for friendless children. The main object, of course, is to remove the vice from the home rather than the child from the home and through the Society's intervention many parents and guardians have been led to deal more fairly by the child, thus making unnecessary any further interference. But in addition to this splendid home-building work nearly four thousand children have been received under the guardianship of these organizations during the past fourteen years and have been provided with foster-homes chiefly in the rural districts. This policy is not only more economical than the crowding of homeless children into institutions, but it is also far better for the child and the community generally. By placing the children direct in foster-homes they grow up under normal conditions, receive individual attention, learn to be industrious and while being helped are also able to help those with whom they live. In a few short years they reach an age of discretion and the practical training they have received enables them to at once take their place as wage-earners and as useful, thrifty citizens. The history records of all these children are kept in the central office and visitors are constanly on he road enquiring after their welfare, giving advice and encouragement to both children and foster-parents and adjusting any little difficulties that may arise. In this way the work is maintained on a satisfactory basis.

As an indication of what is possible with children, it might be mentioned here that as an experiment it was decided to take the boys out of the reformatory at Penetanguishene and by a system of friendly aid start them out again in life under new and better conditions. The confidence and co-operation of each boy was secured and without regard to past offences over ninety boys were liberated on parole. Although nearly three years have elapsed, not more than five or six boys got into trouble and, so far as could be ascertained, there are only two in prison at the present time. With great saving to the Province the old Reformatory at Penetanguishene has now

been turned into an insane asylum. The same policy was tried with the girls who were in the juvenile department of the Mercer Reformatory and they too have responded nobly to the interest taken in them. Some sixty-five inmates, from fifteen to twenty years of age, were placed in situations and of this number five have done badly and six had to be placed permanently in custodial institutions through lack of mental and moral stamina. When it is remembered that these young people had gone very far in wrong-doing and were the despair of the officials who had most to do with them, it can readily be seen what a success the movement has been.

To still further help and protect neglected children an effort is now being made to have the Dominion Government pass a law applicable to all Canada, separating children under sixteen from the criminal procedure, dealing with their cases as "delinquencies" and entirely apart from the ordinary police courts, and seeking to place the responsibility for youthful wrong-doing on the parents and others who, either by neglect or by direct teaching, have aided or abetted the wrong-doing. If this law passes the Dominion Parliament, as it is hoped it will, an important advance step will be taken and a greater work than ever before made possible.

To invite your friendly co-operation is the object of this address. The fullest information will be supplied to all who wish to look into this subject more closely and there will from time to time be opportunities afforded every one present for helping in an intelligent way to secure justice and fair treatment for young people who at present are being denied a fair and reasonable opportunity to grow up as useful, industrious and respectable citizens.

ONTARIO CHILDREN'S AID WORK.

At the request of Mr. J. J. Kelso, Superintendent of Neglected and Dependent Children, who is very much interested in the protection of children and wishes the hearty co-operation of the members of women's institutes, the following items are printed here :—

Mission of the Children's Aid Society.

A branch of the Children's Aid Society may be formed in any city, town or village, and perhaps some reader may be in a position to bring about such organization. Generally speaking, the Society's work is :

To rescue homeless, abused and neglected children in the earliest age of their misfortune, finding homes for them in well approved families—to continue a watchful care over them.

To give assurance to the poor and needy that their children, if left destitute, shall be watched over with tender care.

To protect society against its greatest foes—ignorance and vice—by securing proper home training and education for destitute little ones, that otherwise might fall under the most evil influences.

To urge upon parents their supreme responsibilty for the proper care and training of children so that they may grow up into good citizens and be a credit and honor to the State.

No costly buildings are necessary to carry on the work. What is needed is the devoted service of good people who love children, and who give freely of their time and thought. The home life of neglected children may be greatly improved by kindly intervention, and, failing this, the strong arm of the law can be invoked. For homeless children all possible effort is made to place them speedily in reliable foster-homes where they may know the pleasures of childhood and receive useful training for later life. In an institution the cost is over $100 per year for each child, and the work is but half done.

Definition of Neglected Child.

Any child apparently under the age of fourteen years if a boy, or sixteen years if a girl, who comes within any of the following descriptions, namely:

(*a*) Who is found begging or receiving alms or thieving in any street, thoroughfare, tavern or place of public resort, or sleeping at night in the open air;

(*b*) Who is found wandering about at late hours and not having any home or settled place of abode, or proper guardianship;

(*c*) Who is found associating or dwelling with a thief, drunkard or vagrant, or who by reason of the neglect or drunkenness or other vices of its parents and guardians is suffered to be growing up without salutary parental control and education, or in circumstances exposing such child to an idle and dissolute life;

(*d*) Who is found in any house of ill-fame or in company of a reputed prostitute:

(*e*) Who is found destitute, being an orphan or deserted by its parents or having a surviving parent who is undergoing imprisonment for crime.

Extracts from the Statutes.

Begging.—Any person sending children begging may be sent to gaol for three months or fined $100.

Liquor-Selling.—Any saloon-keeper who gives or sells liquor to a youth under twenty-one years of age, is liable on conviction to a penalty of $20.

Tobacco.—Any person found guilty by a justice of the peace of giving or selling tobacco to a boy under eighteen years, must be fined $10 and the sum may be increased to $50.

Pool Rooms.—The keeper of a licensed pool or billiard room who allows boys under sixteen years to frequent his premises, may be fined $10 by any justice of the peace, half the fine to go to the informant.

School.—Every child between the ages of eight and fourteen years must attend school, unless excused for some good reason.

Factory.—No children under fourteen years of age can be employed in any factory.

Indecent Conduct.—Any person found guilty by two justices of the peace of committing any indecent act, may be fined $50 and sent to gaol for six months.

Criminal Assault.—Any person who criminally assaults a girl under fourteen years of age is liable to imprisonment for life.

Pistols.—Any person who sells or gives a pistol or air-gun or sells ammunition therefor, to a boy under sixteen years of age, is liable on conviction to a penalty of $20.

Neglected Children.—Can be removed from the control of vicious or drunken parents if there is no likelihood of improvement.

Enquiries regarding child-saving or applications to adopt children received and answered.—*J. J. Kelso, Superintendent Neglected and Dependent Children, Parliament Buildings, Toronto.*

ADDRESS.

By C. C. James, Deputy Minister of Agriculture, Toronto.

After referring to the work of Mr. Kelso and commending it to the attention and goodwill of the ladies, Mr. James referred to the importance of having some information in regard to milk and its products imparted in the public schools, and urged the ladies present to talk up the matter at home and to start an agitation that would result in something being begun along such lines. He concluded his talk with these words:

"I have come to the conclusion that the affairs of this country are in the hands, not of the men, but of the women. It was one of the most healthy signs for the advancement of agriculture when the Women's Institutes were instituted. The first convention was held at the Agricultural College only a few years ago; yet now the largest hall we have is not sufficiently large to accommodate you. It means that you have instituted a line of work that finds a response in the home life of this country. The Institute is meeting a long-felt want, and if you women will just take home from this meeting a few messages and become preachers throughout the homes, of the gospel of cleanliness in milk, and if you will begin to express the gospel of rational education in the rural schools of this country, all these things will work out and we shall have something accomplished."

"This is an eventful week in Ontario agriculture. The Experimental Union, which met early in the week, represents the progressive and educated youth of the farms. In the exhibition here—the Winter Fair—we have represented the highest grades of production upon the farm. You represent another side. You represent the home life, the social life. Your work is not less important than these others, and if you compare the financial side, the educational side, and the home life, you know very well which one will stand highest. I do not know of any work being encouraged by the Department of Agriculture that promises more than this Women's Institute work. We have developed the Farmers' Institute work, and the Winter Fair has grown to such an extent that it is a question whether or not we can enlarge its scope, but with the Women's Institute work no one can venture a statement as to the possibilities of the work of this organization. Recognize your powers, your responsibilities, and take home from this convention a few messages which have been given, and when you come back next year you will perhaps be able to report that some progress has been made."

Some of the points taken up by Mr. James were referred to by him in an address which he subsequently delivered at the convention of the Western Dairymen's Association, London, Ont., and it has been thought advisable to reprint them as follows:—

"Let me tell you that the first genuine ray of hope I have seen in connection with this work came into this question, so far as I am concerned, in

the month of December, when I saw gathered at the Agricultural College, 400 or 500 women from the farms of the Province of Ontario. It was the most inspiring convention I ever saw, and the most interesting audience I ever addressed. Just picture to yourself a room like this packed to the doors with women from the farms of our Province, and every woman with her pencil and note-book, taking notes of what was going on. I said to myself as I sat there and looked at them, 'We are at last getting a grip such as we never had before on the agricultural community of this country.' When five hundred women from all parts of Ontario will come from the farm homes to a convention of that kind, meaning business, and to take up questions of vital importance to the agriculturists of this country, there is hope that we are at last going to do something, and that we are going to begin at the right source. The women of this country can do what the men cannot do, and they will make the men of this country do what they would not otherwise do. If the farmers' wives and daughters tell the farmers that they have got to put their stables in a clean condition; that they have to carry on their work in a clean way; that they have to keep their utensils in a clean manner and send the milk to the cheese factory in a clean state; take my word for it, it will be done. We have at last got our foot into the farmers' home, and until you can revolutionize the farm home life of this country there is not much hope of permanent success. It is all very well for the farmers to leave home and come to London or Ottawa for a few days' or a week's holiday, have a prety good time listening to the speeches, and then go back again and perhaps not be able to tell very much of what went on, except that they heard some good songs, and had a good time. But that is not what is going to revolutionize this country. You have to send men home with the determination that they are going to clean up and do things better than they ever did before. The centre of the farm work of this country is not on the front concession or on the back road; it is not out in the stable or in the fields, but it is right in the home where the farmer lives; and if we can only start within the four walls of that home we will accomplish a great deal more than we have ever been able to do through conventions or dairy schools, or anything else. If we can deliver the gospel of cleanliness in the farm homes of this country there is hope of doing something. When I saw that Women's Institute convention listening to addresses on the subject of pure milk production, and of what it meant to the health, wealth and happiness of the country, I said, 'This is the best dairy convention I have ever attended, and this is the best work we have ever undertaken in this Province.' The Farmers' Institute work grows very well, but the Women's Institutes of this country are growing at a tremendous pace. You have no idea of the great social revolution that is taking place in connection with the agricultural life of this country. I pleaded with these women to go home and demand that something should be done in the rural public schools of this country to help out our agricultural work. If we can get the farmers' wives and daughters to work on this question of pure milk, whether for home consumption or cheese-making and butter-making, and if at the same time we can have introduced into our rural schools some simple instruction so that the boys and girls will get some little knowledge of what milk is, of what the value of milk as a food is, and the necessity for its being kept absolutely clean, then, and not till then, will we have this question finally started along right lines. Otherwise we will meet year after year in convention and go over the same old ground again, meet the same difficulties, and will not make half the progress that we should have made."

CARE OF THE MOUTH AND TEETH ESSENTIAL TO GOOD HEALTH.

By A. E. Webster, M.D., D.D.S., L.D.S., Toronto.

I wish to congratulate this organization first for having seen far enough into the present modes of living to know that the condition of the mouth has some relation to general health. I also wish to congratulate you for undertaking a work which the Education Department has shied at for years. And above all, I wish to congratulate you for having the means and the power to carry out your convictions. Some one has said that the health and the morals of a nation depend upon its women. This is a truer statement than many of us realize, and it is of greater importance to a nation than even its leaders are sometimes willing to admit. A nation's greatness depends so much upon its good physique and good morals that it is fitting for this great organization of women to interest itself in every matter which tends to better the health of the people. A woman who is not capable of feeding and training a human being to take his part in building a nation, such as we hope for in Canada, should not be entrusted with such responsibilities. This fact has been recognized by the leaders of nations and they have set about in many ways to have their views carried out.

Recruiting for the army in Great Britain during the past decade has brought out the fact that the physique of the nation is rapidly deteriorating. A commission was appointed by the Government to investigate the cause of this loss of physical strength. Among other things, this commission reported that the children were improperly fed, in some cases underfed, and in many cases incapable of assimilating the food they received because of the defective condition of their teeth and the consequent unhealthy state of their mouths. Thus you can see how a subject, which would seem to be a personal one, becomes of national importance. A nation of toothless adults could never endure the hardships of warfare. Both the army and the navy have recognized the importance of good teeth, because only such recruits as can properly masticate their food are accepted. Thousands of recruits in Great Britain alone have been rejected for want of good teeth. Nurses, bank clerks, and many others are required to present a certificate of a healthy mouth before they enter upon their duties. Some life insurance companies will give a specially low rate to those who have good teeth and a clean mouth. Again we see the recognition of the importance of a healthy mouth to the general health.

This is the first official step taken in this country to set forth the importance of oral hygiene to the mothers of the nation. You may clothe your children well, you may give them wholesome food most temptingly prepared, but, if they cannot masticate it properly because of sore gums or defective teeth, you will raise a nation of weaklings.

Now, why has this subject come into importance during recent years? Our forefathers had better teeth than we, and yet they used no toothbrushes. Why this change? Decayed teeth and unclean mouths is the price we pay for modern civilization.

Those people and those nations who are to-day living upon coarse farinaceous foods, meats not pounded to a jelly, and starches not stewed into a paste, have little trouble from decay of their teeth. Our forefathers ate such food as exercised their teeth and gums, while we eat foods which are made into a pasty, sticky consistency, requiring no mastication before swallowing. The particular kind of food has much less to do with the decayed teeth than its preparation for eating. Nature intended that our foods should

be hard and tough, requiring a great deal of force for mastication, else she would not have supplied us with teeth so hard and muscles so strong. Did you ever realize that many of you can close your teeth with a force of 200 pounds? A beefsteak requires a force of from 60 to 80 pounds to cut through it with ordinary teeth. If these powers were not intended to be used they would not have been given to us. Those tough, hard, natural foods which our forefathers used scrubbed, exercised and massaged the gums and kept them in a healthy condition, while our soft foods do not give the gums the exercise they need and in consequence they become soft, spongy, and bleed easily when touched. Besides the beneficial effect these hard foods had on the gums, and teeth in general, they exercise their most beneficial effect in preventing the decay of the teeth.

I might say here that decay of the teeth is due to *micro-organisms* becoming lodged in some crevice in the surface of the enamel and being allowed to remain quietly in position until they develop an acid which dissolves the tooth substance. Once the surface of the enamel is penetrated, decay can go on uninterruptedly. As you will note, decay begins on the outside, and the organisms which set up decay must not be disturbed or they will not grow. They are plants and will not grow if disturbed, no more than a bean. Then it must be plain to you that if the surfaces of the teeth could be kept clean decay would not occur. That is, if the organisms were frequently disturbed or scrubbed off, they could not grow. This is just what those hard, tough foods did for our forefathers, as they sunk their teeth through a piece of food, it scrubbed every surface of the tooth, removing any bacteria that might chance to have become attached. You can readily understand how the teeth can be cleaned by forcing them into a hard apple or chewing a good tough piece of beef or properly masticating one of those old-fashioned biscuits. Compare the cleansing effect of these substances on the tooth surface with corn-beef hash, tapioca pudding, mince pie, bread pudding, boiled rice, jelly and whipped cream, coffee, cream, sugar, and cake. These substances not only do not cleanse the surface of the teeth, but they contain all the elements to cause decay, besides the power to stick closely to the tooth's surface. They are taken at the last of a meal, thus giving them unusual opportunities for sticking to the teeth and developing micro-organisms. It is a fact that the organisms of decay only develop in starches and sugars; thus you see how well suited many of these much prized articles of diet are to cause decayed teeth. The substances mentioned are the very ones used in bacteriological laboratories for growing micro-organisms,—jelly, meat, broths, potatoes, sugar, and jelly together with milk, and blood serum. These are kept warm and moist; so are they in the mouth, perfect condition for growth.

To repeat, the mastication of tough, hard foods of the hydro-carbonaceous variety cleanses the teeth, prevents decay, exercises the attachments of the teeth, massages the gums, while sticky, gummy, starchy, sugary foods do not cleanse the teeth or exercise them in their sockets nor massage the gums, but do assist in causing decay. Now what can we do about all this? We cannot expect you good mothers and housewives to stop making mince pies and angel cake, and we won't stand for tough scones and beef all gristle. But you can see that your children have one article of diet at each meal that requires mastication before swallowing. You know chewing food becomes a habit, and if children are always fed upon foods which do not need mastication, they will never develop that power. The chief harm in swallowing food without mastication is the need for its being thoroughly mixed with the saliva, because the saliva plays an important part in diges-

tion. Since the foods we eat nowadays do not clean our teeth and massage our gums, we are compelled to use other means to this end. We use the toothbrush to cleanse our teeth and rub the gums with a towel on our fingers. We are compelled to scour our teeth with a grit to remove sticky foods, stains, and concretions.

Before discussing the details of how to care for the mouths of children, because if neglected the consequences are of greater moment than in adults, let us consider the effects of not cleaning the teeth, first locally, then generally.

It must be admitted at the outset that, though we try ever so faithfully to keep our teeth clean, while we continue to eat slops and pastes of starch and sugar, our teeth will decay. But they will not decay on the surfaces exposed to the action of the toothbrush. Teeth decay in direct proportion to their uncleanness. Now let us consider a case. A child two years of age has twenty teeth and is capable of masticating all ordinary food. But does he get a chance? Not often. Poor dear little fellow, it is too much work for him to masticate a crust or a rusk; they must be soaked in milk, or he must get only porridge, milk, and soaked bread. It isn't long before his temporary teeth begin to decay. One or other becomes tender to bite upon or sensitive to cold water. More reasons for keeping them unclean. No attempt is now made to either masticate on the side of the mouth with the sore tooth or to wash the mouth with water. This tooth and others decay more rapidly, because the micro-organisms are not disturbed any more than slight cultivation by bringing new food to them by each meal of slops. Actual pains ensue. The child loses rest, besides not eating as well, from having sore teeth and a deranged stomach from swallowing many organisms from about the sore gums and teeth. Mothers often have an idea that children so young should not have toothache, and therefore they haven't. A child so fed may not reach the fifth year without having had many paining teeth, sore gums, abscesses developed, and what is worse, he has not learned to masticate food.

That insane notion still holds on to some people that, because a child's baby tooth is decayed or paining nothing should be done for it except perhaps extract it. If, ever during the whole existence of a human being, he should have the advantage of a good set of teeth, it is during the developmental period. Up to the age of 18 or 20 the boy must assimilate food enough not only to keep up the natural waste, but also provide for developing his physical and mental powers. The adult may only keep up the body after it is developed. No child can develop properly if he has a nagging toothache, sore gums and indigestion from want of proper mastication of food and the swallowing of pus and infectious matter from the mouth. The future of a boy or girl is often handicapped more by improper develpoment from this cause alone than from want of our so called education. What good are fine schools, good teachers, suitable clothing, and abundance of food to such a child? He cannot attend to his school work or enjoy his surroundings, if he cannot digest and assimilate his food. Decay of the teeth is a disease of childhood. Persons who reach the twentieth year without a decayed tooth will likely escape until the fiftieth or sixtieth year, when other troubles will arise.

Decayed and decaying teeth have a train of local consequences worthy of considerable thought by both parents and the state.

As the tooth decays, it becomes sensitive to heat and cold. It often pains when the patient goes out into the cold air or drinks cold or hot fluid. The pain becomes more frequent until it begins without known cause and

lasts for hours, causing most intense suffering. Sometimes warm applications will relieve these cases, but not always. The same tooth may have several attacks of this severe pain at intervals of days or weeks. During any of these attacks the patient is incapable of doing his ordinary duties and bears more real suffering in any five minutes than will be caused by having the tooth properly treated and restored to health and usefulness. The patient is prostrate during these attacks. Such a tooth may now cease to give pain for months, though there is a large cavity in it; but it is likely to begin to get sore to the touch. It seems longer than the rest. A deep throbbing pain is felt in the jaw. It becomes worse and worse; the tooth is now so sore that it cannot be touched without causing severe pain. There is loss of appetite, loss of sleep, a general feeling of lassitude, with fever. This may go on for two or three days, during which time the patient is prostrate. The face may show signs of swelling, after which the acute pain may subside slightly, but the general condition of the patient does not always improve. There is developed in such cases an abscess in the jaw bone, due to infection from the decayed tooth. It is now no longer a disease of the tooth, but it is a disease affecting the bones of the face, and, unless the patient has a good deal of resistance to infections of this character, large portions of the bone may die and afterwards come away or the patient may succumb to the general infection. Many deaths from this cause have come under my notice.

Poorly nourished children are prone to disease of the bones of the face from such neglected teeth. Several cases of this severe character are treated annually in the Hospital for Sick Children, in Toronto. I saw one case recently where a child lost the whole lower jaw from neglected teeth. While few cases have a serious result, the great majority tend to recover by nature forcing an opening for the drainage of the pus into the mouth or on the face. When such an abscess opens on the face a very disfiguring scar is left. The opening draining the pus from the abscess, which is situated in the bone, may close occasionally and a repetition of the pain and swelling will be gone through again before the pus can find its way out. But the great majority remain open and the patient swallows a quantity of pus every day. If several teeth in the same mouth have gone through this trouble there will be large quantities of pus swallowed daily. Many people go on for years sucking pus out of their gums and swallowing it with their meals and think little of it, and yet they would revolt at taking an equal quantity of pus from a boil and swallowing it with their food. Besides the pus taken from this source, there will be large cavities in the teeth which are receptacles for food to lodge in and become decayed. These cavities will to some extent be emptied of the decaying matter at each meal, and this is added to each bolus of food as it goes to the stomach. As this history goes on for years, the tops of the teeth decay off and sharp edges irritate the gums until they become red, inflamed and exude pus and blood on being touched. These sharp corners of teeth and roots are often the starting point of cancer among old people.

A patient with such a mouth as I have described will have attacks of sore mouth, sore throat, and on the slightest exposure will take cold with severe tonsillitis. With such inflamed tissues in the mouth they are more likely to contract any of the contagious diseases, such as diphtheria, scarlet fever, measles, chicken-pox, or whooping cough. All of these diseases have a tendency to leave the patient with some severe after trouble such as abscesses about the face, loss of smell or total deafness. It has been shown in hospital practice that in all cases where the patient's mouth and teeth

have been kept clean during the disease, none of these after troubles occur. It has also been shown that where the mouths have been kept clean the disease does not often occur. Tuberculosis germs are more easily implanted in the throat and lungs of a person whose mucous membranes are in a constant state of irritation and infection.

There is an aspect of the unkept mouth of middle life that deserves attention. As we advance in years our gums shrink, which leaves spaces around the necks of the teeth. These spaces become filled with food, which soon becomes foul and irritates the gums and the necks of the teeth. Decay of the teeth is likely to occur, and there will appear a good deal of hard calculous of the same character as that which collects in a vessel in which water is boiled. This deposit on the necks of the teeth gradually irritates the gums, which recede, exposing the roots. The deposit goes farther and farther up the tooth until it really loosens its attachment, becomes loose and drops out, or has to be extracted on account of its troublesomeness. Around each one of these teeth so affected is a hotbed of infection. Pus is developed in abundance and swallowed with the saliva and the food. More teeth are lost by this disease of the gums than by decay, and the effect on the general health is often more baneful because it comes on insidiously, and in its early stages there is but little paid. It is a filth disease and can be prevented by proper methods of cleaning the mouth and teeth. The person who loses his teeth from this disease, which is known as Riggs Disease, or Pyorrhœe Alveolaris, has not kept his teeth or gums as clean as he might.

Having discussed at some length the consequences of an unkept mouth on the tissues of the mouth and their immediately surrounding parts, let us consider what effect an unclean mouth has on the more remote parts of the body. It may be stated that almost all diseases of the human family gain entrance to the body through the mouth or nose, and among these are the most fatal, such as tuberculosis, pneumonia, diphtheria, scarlet fever, typhoid fever, etc., and there is the whole list of diseases of the intestinal tract, indigestion, dysentery, diarrhœa, constipation, and the consequence of these on other organs such as the liver, kidneys, heart and blood. The mouth stands as the vestibule of the body and unless it is kept clean there can be little hope of keeping the inside in order. For centuries the general practitioner of medicine has satisfied himself with treating diseases after they have developed. It is only within more recent years that he thought it any of his duty to instruct patients how to prevent having diseases. In a measure, the State has undertaken the prevention of diseases as a business proposition. It segregates those having infectious diseases, it examines immigrants, it is in a half-hearted way examining foodstuffs and will some day compel vendors of foodstuffs and drugs to supply a pure and a clean article. This is all good. But of what value is all this clean food to the person who keeps an incubator in his own mouth running twenty-four hours a day, developing the very disease germs which the State is taking so much pains to keep from our food and water supply? The State has become interested in domestic science, and especially in the preparation of the food for the table, because it knows that the health of the nation depends to a large extent upon what it eats, but of what value are all these specially prepared and sterilized foods, and I might say the whole subject of dietetics, to a person who covers each portion of his food with pus or other deleterious organisms from oozing abscesses and filth caverns in his mouth? These unclean boluses of food are carried to the stomach and there the digestive juices must take care of them. For a time the stomach may not be infected by them, but sooner or later, depending upon the resistance of the tissues

A MEMBER: A buttermaker from one of our creameries came here last fall, and I asked him what he was paying per pound for fat, and when he told me I did not see how he could do it, and when I questioned him I found out that they were gathering eggs and poultry, and in that way they were making enough to pay the cost of hauling cream.

Mr. McDONALD: The Government of Alberta gave the farmers the market price for their poultry, 10c. a pound, and when they sold them they averaged about 19c. a pound. They made an advance to the farmers of 10c. a pound, and then the Government fattened them, and they were able to pay the farmers 7c. more. The egg gathering system did not work very well; it was always thought to be too much bother collecting the eggs. The country is very rough, and a great number of eggs are broken. If you start that business here you might not have any cheese or buttermakers after awhile. I think it should be a business by itself.

Mr. CREELMAN: The difference received from these birds in Alberta was the difference in the market price for the fancy article and the ordinary chick as put on the market?

Mr. McDONALD: Yes; we will be able to get all kinds of chickens out there next year.

Q.—How is the average poultry placed on the market in such towns as Calgary, Medicine Hat and Indian Head?

A.—In a pretty rough state.

Q.—Would there be a chance to ship any Ontario poultry?

A.—Yes.

Q.—Do you think there is any Ontario poultry shipped west?

A.—I do not know.

Mr. CURTISS, Ransomville, N.Y.: I remember one instance when we had so many ducks on hand that we could not get a price, and the Hotel Iroquois, in Buffalo, offered us 10c. a pound, and as we could not get any more we let them have them; and they put them in cold storage till they used them. The next year they came after more ducks but they could not get them for 10c. a pound, and they paid us as high as 26c. a pound then; they were bound to have our ducks. That is the way we built up our trade in Western New York. We have a trade in Buffalo, Niagara Falls; and other large centres, such as Rochester and Syracuse, and have over 100 customers. We send ducks as far as the city of Cleveland, and the leading hotels in Cleveland are using our ducks and paying us 25c. a pound when they could buy ducks on the local market for 14c. If you have the article in proper condition you will get the money for it.

Q.—How many ducks do you raise in the year?

A.—40,000. Ducks are our strong hold, although we raise quite a number of chickens. We have 64 acres of land. Our feed bill last year was in the neighborhood of $20,000. Our farm is just for our birds; it is practically all in poultry. We have 24 acres in which we grow green feed, and sometimes we get out and buy a field of hay and cut it green and draw it in and feed it to the ducks.

Mr. NIX: The farmers do not realize the possibility of poultry as an adjunct to their business, and they lose a lot of money by not marketing their poultry in the proper shape. Successful fruit growers now spend a little money in ribbons to decorate their packages, and they bring them in dollars of profits.

HOW WE RAISE 30,000 DUCKS ANNUALLY AT A PROFIT.

By W. R. Curtiss, Ransomville, N.Y.

In growing ducks there are a good many things that we do not do the same as we do with chickens, and there are some things that we do the same. It is harder manual work to grow ducks than chickens, and you have got to use a lot of judgment.

In the first place, I will explain how to get the stock. If you get weak stock it will show up for a number of years, and we have to be very particular about this. Therefore, I will go back to the ducks that lay the eggs that produce the ducks that lay the eggs that the ducks are hatched from, and we can go back farther than that with good results. You cannot go back too far. We will suppose that the ducks that lay these eggs are good strong healthy ducks. We set the eggs in a machine, and we put them in the brooding house, and brood them the same as we do the ducks for market, until they are eight weeks old, and that is the time when we fatten ducks for the market. Before these ducks are fattened, we sort out our breeding stock, at the age when the ducks are old enough so that we can tell the sexes. I go through a large number of ducks, and perhaps I might get five or ten fit to breed from out of a large block of 100. That seems like a lot of work. Every time you change the feed the ducks won't eat, and if you change gradually they will probably be off their feed for two days; and just at this time we sort out the breeding stock, and it is just at the time we change the feed, so that we do not lose anything. I sort these ducks personally, because I believe it is the foundation of the whole duck business. We handle the ducks by the neck; we never take them up by the legs. We hold the duck up and look at him, and if he has a good broad breast all the way through, and fairly deep keel, and broad back, and not too long a neck, and his head not too long, and if he fights a great deal and tries to get away, showing he is strong, then we will pick out that duck. He has got to be a certain weight; we do not actually weigh them, because that is too much trouble. In handling so many ducks we get so that we can tell the weight of a duck very closely; we can guess within a quarter of a pound of the weight, and we can tell almost the minute we pick up a duck whether it is one we want or not. They are then put over into pens by themselves and after we get them picked out we drive them about half a mile to a field where we pasture them for the summer.

We pick the breeding stock out in May. You can take them out in April or March; but with us the price of ducks is considerably higher in March and April than it is in May, and when you are marketing 4,000 ducks a week, the lowering in price of two cents a pound is quite an item. But as long as we can get as good results from the May hatching of ducks we see no object in getting earlier ducks.

We take the ducks out in May, and they are taken out in flocks of 200. We start and drive these ducks over to the pasture, and in driving them we will say we have 210 or 215. We keep them in a large wood lot. We take lots of time driving them along, not too slow, and not so slow as you would drive market ducks. We keep them moving, and when we get them half way over, there are two or three of them will break down, and flags their wings, and they cannot walk. These ducks are left right where they are. It is simply the survival of the fittest, and when we get to the breeding pens there will be ducks strung all the way along where we have been driving them. It is only the ducks who have strength enough to walk this distance, being urged

our characters. The face of a country has a strong influence on the disposition and temperament of its inhabitants. Dwellers in mountainous countries are usually of a cheerful, contented disposition; those of level, monotonous countries are strongly inclined to melancholy and pessimistic views. The people of the Highlands of Scotland are free and light-hearted, so are the dwellers of the Alps. The Russian people are exactly opposite, being sullen and down-trodden.

We have a striking example of climatic influence and environment in our own Dominion, when we study the history of that little far-away Province by the sea. Nova Scotia has given us more noted and brilliant men than any other Province in the Dominion. These men were not brought up in the lap of luxury or caressed by gentle breezes, but rose, it would seem, by reason of their rugged and often lowly surroundings. A rugged country breeds strength and daring, and gives us men strong in mind and body. We have but to compare the native men of the North with those of the South to see the marked influence of heat and cold.

Then there is the local influence of certain localities. The environment of Boston is decidedly literary and learning is worshipped there, so when a new comer arrives, the question is, "How much does he know?" In Philadelphia, rank or social standing is worshipped and naturally the enquiry is, "Who was his father?" In New York, the dollar is the standard men are measured by, therefore, the question to be first asked and settled is, "How much is he worth?"

There is still a greater social influence, and that is our immediate surroundings. We haven't as yet realized what it means to ourselves and our families to have the home attractive. I would indeed be glad to have more parents understand that, when they spend money judiciously to improve and adorn the house and grounds, they are in effect paying their children a premium to stay at home as much as possible to enjoy it, but when they spend money lavishly and unnecessarily on fine clothes and jewelry for their children, they are paying them a premium to spend their time away from home in places where they can display their grandeur and attract the most attention.

The ancient Romans placed the busts of statues of heroes in their homes, that their children might have constantly before them illustrious examples and so be inspired to imitate the virtues that make men heroic.

We have not laid stress enough on the power of the eye to strengthen the mental forces within us. The Roman Catholic church has largely used the eye to influence the religious attitude of its adherents. For this reason we find in visiting their cathedrals, beautiful paintings or prints or statutary. Just here we might say a word about pictures and wall-furnishings. People have their feelings wrought upon by different things. Music inspires and thrills some, but nothing so impresses me as a beautiful picture. We should choose with discretion the picture we hang upon the walls of our home. When so many of the best works of art are so well and cheaply reproduced, there is little excuse for having poor, unsightly prints fill the frames. Emerson says, "Do not hang a dismal picture on your wall." How often we see heart-rending scenes of ship wrecks and battle fields placed in conspicuous places where they constantly meet our gaze. Children often have a fine sense of what is pleasing or repulsive. Lately I was reading to my nephew (eight years old) some of Seaton Thompson's animal stories. The book was illustrated, and when we would come to a picture that was cruel or unsightly, George would say, "That isn't nice to look at, is it? We'll cover it up,"

and he'd place a loose leaf over the page until he could turn it over. This he did with no suggestion from me.

By proper surroundings, let us cultivate in our children a love for the true and beautiful in art.

The paper on the walls of our homes has a subtle influence over us. I remember being in one home where the walls of certain rooms were painted a dark, heavy green. I felt if I had to live in such apartments, I'd take a fit of the blues, or have an attack of jaundice. Light paper is more pleasing than heavy dark paper, makes the rooms look larger and affords a better back-ground for pictures.

We should try to surround ourselves with light and bright things, and especially with plenty of sunshine. Florence Nightingale, the queen of nurses, said, "It is the unqualified result of all my experience with the sick, that second only to their need of fresh air, is their need of light. They want direct sunlight. Put the pale plant and the sickly human being in the sun, and, if they are not too far gone, each will recover health and spirit. A gloomy room bodes gloomy thoughts."

We have spoken largely of the effect of the material environment, but the moral atmosphere in which we live has a still greater influence over us. The bright and cheerful woman makes a cheerful world about her. By education and control of our will, we make life largely what we wish. Happiness was born a twin, so if you would be happy it is something you have to share. "I make my invalid brother Jim happy, and he laughs, and that makes me happy and I laugh."

It is a sad truth that children often receive from their parents the first lessons in stealing and untruthfulness. A father takes his little son into a store and helps himself to a piece of candy and gives the child a piece. No harm is meant, but a tiny seed has been sown which may end in serious trouble. A mother by her extravagant use of the English language, teaches her little ones to place no value on the truthfulness of her sayings. She threatens to throw them down stairs, to half kill them, etc., if they do not cease from doing such and such a thing. The result is they neither obey or believe her.

Many a little one is brought into the world handicapped for life through the uncontrolled will or ignorance of the mother. Many a woman, through ill-health, is cross and peevish and this disposition she often gives as an inheritance to her child. Life is hard at best, and the children have a right to claim a good disposition and a sound body, and the mother has a greater control over these, than many a one knows of.

Often we bemoan our environment, but ours it is to rise above it. When Elihu Burritt, the learned blacksmith, first entered the manufacturing business, he found everybody trying to sell cheaper than his neighbor, and so making a poorer and poorer article. "I determined that I would not undersell, but excel," and so he did, till he had no competitors in the market, and became noted and rich.

Mental exhaustion comes to those who look ahead, and climb mountains before they arrive at them. Worry upsets our whole system, in fact actually poisons our blood. Cheerful work keeps us in health and order. We should try to live in the present. The past is gone, the future is uncertain. Enjoy the hours that are, the air, the birds, the trees, our friends, our work, and bear as patiently as possible with sorrow or pain that comes to our lot.

THE SUNNY SIDE OF LIFE.

By Miss Gertrude Carter, Guelph.

Oliver Goldsmith says, "The fortunate circumstances of our lives are generally found at last to be our own producing," while another author expresses a similar idea in the lines, "For all may have, if they choose, a glorious life or grave." If our lives are happy, bright and useful is it not because we have aimed to make them so, instead of trusting to fate or circumstances to bring us happiness. The woman who can see the sunny side of life, the one who can find the bright spot in the hard places will accomplish more and get more real happiness out of life than the one who habitually sees all the dark places.

It is easy enough to be pleasant
When life flows by like a song,
But the one worth while,
Is the one who will smile
When everything goes wrong.

There are many things which will help us to find the sunny side of life and a glance at a few is the purpose of this article. The foundation stone of a successful life is a thorough knowledge of our work. We cannot expect to be successful if we have acquired careless habits, and have allowed ourselves to think that knowledge of our work, sufficient to hold our position, or to get our work done in some way, is enough. We should know every phase and condition of our work and know it thoroughly. If we are home-makers we should make that our special work, and our aim should be to find out anything and everything which will help us to become a first-class home-maker.

But someone says, how can we obtain this knowledge of our work? The majority of the members of our Women's Institute are wives and mothers who could not think of leaving home to take a course in household science. There are four ways in which we can obtain information in our line of work. The first,—observation,—is more widely used than we think. A woman goes into a neighbor's house, store, or some other place where she sees a labor-saving device or quicker and better method of doing some work. She accepts the idea, carries it home, and puts it into practical use.

Reading is the next method in general use to-day. The subject of home-making is of interest to everyone, so, it is almost impossible to pick up any magazine or newspaper which does not contain one or more articles on that subject. Of couse it is not to be thought that we should retain all we read, or that we should put it into use. It may be necessary to read many pages before we get an idea or a suggestion which will help us, but when we find such a thought it fastens itself on the memory, and the idea becomes our own to be put into practical use in our lives or homes. The best magazines and literature should have a place in every home; more than that, they should be read. As we are known by our companions, so are we known by the literature we read.

The third method of obtaining information upon our chosen subject is through the medium of the Farmers' and Women's Institutes and similar organizations. There, the member is not only using her powers of observation, in watching and learning from the other members, demonstrators, etc.; not only does she read the thoughts and suggestions of the best authors on

home-making, placed within her reach by means of the library of the Women's Institute but she thinks for herself, thus broadening her mind and obtaining a thorough knowledge of her work, and making life a pleasure to herself.

The fourth method is the course of household science which may be taken at almost any Ladies' College, for the different heads of the colleges, recognizing the importance and need of such a course, have not been backward in placing it on the curriculum. We, of course, think that the best place to take such a course is at the Macdonald Institute, Guelph.

We cannot be very successful nor happy in our work if we do not like it, so, after knowledge of our work, comes next in importance, either a natural or acquired liking for our chosen vocation in life. We are not all of the same temperament, tastes, our circumstances, but every mortal girl expects at some time to be mistress of a house of her own. Some are gifted with a natural liking for house-keeping and home-making, while others find it a hard and wearisome task, yet both may be successful and happy home-makers, the one, because she delights in the task, the other, because she is determined to be a successful home-maker; so, while she lacks the natural ability she will be successful because she has acquired the ability to make her life happy and successful. Miss Van Ransselaer puts it nicely when she says, "If we cannot have what we like, let us like what we have."

If we feel the nobleness of our calling we will believe in it. The doctor, the lawyer and the minister believes in his calling; he spends many years in preparation and looks upon his as the best and the noblest in the world. Why should not the home-maker believe her calling to be the grandest of all? Need she feel ashamed of it? Need she offer appoligies because she has to do her own work? Oh, no. Rather ought she to be proud that she has the health and ability to fill the grandest of all positions, that of wife, mother advisor, counsellor, companion, home-maker.

The power "stick to it" is frequently brought before us, many times being the difference between success and failure. Not long ago, I attended a S. S. picnic where the children were running races. Just after they had nicely started one little tot fell down, then, while the others ran towards the goal, she picked herself up, and ran crying towards her mother. Two young ladies, sisters, were standing near, and one, turning to the other, said "There, do you see yourself? That is what you have done all your life.' The next race was called, and wedged in between several older boys was a little chap just about half the size of the others. They had gone but a few steps when he was knocked down, but like a flash he was on his feet again, and the look of determination on his little face was beautiful to look upon. He did not win the prize but he reached the goal just about as quickly as the others. If, when we are knocked down, we could only learn to get up and go at it again harder than ever, surely we must be the better and stronger for the fall.

Then again, we need the best methods and the best utensils. This is an age of advancement, of improvement, and it is necessary for us to keep up with the times. "The history of our race is the story of the evolution of special arts and crafts, from the modest efforts of primitive man to increase his comfort up to the modern demands of luxurious life." What a difference between the cooking apparatus of our grandmothers and the modern gas range. A woman cannot do her best if she has to use year in and year out an old worn out stove. It is a duty she owes to herself and a duty her husband owes to her also, to see that she has a good range or cooking stove.

When we do our best at all times, the satisfaction of knowing that we have given our best will bring pleasure in itself. Carlyle says, "Our grand business is not to SEE what lies dimly in the future, but to DO what lies clearly to hand." If we do the little things well, the habit of carefulness will grow upon us, so that when the big things of life come to us we will be able to do them well also. "Nothing is so contagious as example. Never was there any considerable good or evil done that does not produce its like." How often we hear the expression, "He is a chip off the old block." Children will follow the example of their parents, so how necessary it is to do the very best under all circumstances.

To get the best out of life one needs to cultivate a cheery disposition. When we feel that we have more troubles than we can stand, that is not the time to think about them, so that they grow enormously large, but that is the time to go out in the fresh air so that we may enjoy the beauties of nature; or that is the time to visit a sick friend. We will find that others have more troubles than we have, and when we sympathize with others we forget our own troubles. Sometimes we get into the habit of complaining about every little ache or pain. It surely cannot be very pleasant for a husband to hear day after day of a headache, etc. Should we not endeavor to keep in good health, try to overcome the little vexations and trials of life, and endeavor to be happy, and also endeavor to make those with whom we come in contact happy. There is nothing so contagious as a sunny smile. Gloom, vexation and trouble fly before it. A few lines from Rogers' "Humble Life," in which he describes what he considers a perfect woman seem to be a fitting close.

"His house she enters, there to be a light,
Shining within when all without is night
A guardian angel o'er his life presiding
Doubling his pleasure and his cares dividing
.....
Ever on the watch to borrow
Mirth of his mirth, and sorrow of his sorrow."

CONTAGIOUS DISEASES.

By Helen MacMurchy, Toronto.

(Introductory).

(A more exhaustive article, by Dr. MacMurchy, upon this subject will appear in one of our future publications.)

Like many other words in our language, the word "Contagious" expresses an idea which is but partly true. We used to think that certain diseases could occur only when a healthy person touched one sick with the disease: and then that the healthy person contracted the same disease. Hence the word "Contagious" (contact). But afterwards we learned that certain diseases became epidemic (widely-spread among the people) when the healthy persons had not even seen the sick persons from whom they had taken the disease, far less touched them. And we described that by saying that they had in some manner got the "infection" of the disease. These diseases, not spread by touching or direct contact with the patient, but spread in some other way, were called "infectious." The distinction between the two words was never very clear, so that it is really better not to use either of them, or

to trouble ourselves about the distinction between "infectious" and "contagious," but to use a word which is both simpler and more scientific, and speak of "transmissible" or "communicable" diseases, to signify those diseases which may be, and often are, transmitted from one person to another. Indeed, the old and familiar term "catching," though perhaps not very elegant, will do almost as well as any other word, as long as we understand clearly what we mean. The great thing is to think clearly and understand what we mean by the words we use. Now the word "catching" or "communicable" brings clearly to the mind one idea, namely, the danger that the sick are to the well.

First of all, let us consider this. The idea of danger may easily be over emphasized. In dealing with sickness, as well as in all earthly affairs, the most stupid, the most cruel, and the most costly state of mind is the state of panic. The man or woman in a panic cannot think sensibly, cannot act kindly and humanly, and may do more damage in an hour or two than a year's hard work will pay for. The history of all the horrors that have ever happened proves this.

In the year 1892, when cholera broke out in Hamburg, the hospitals in London and the south of England simply prepared a special ward for cholera patients, if they came, and called for volunteers among the doctors and nurses to take charge of these wards. They got all the volunteers they wanted and more. Then everybody calmly went on with their business and there was no panic, though the danger was a real one and a near one. It was not so in some other countries where panic reigned at the first suspicion of a case of cholera, resulting in great loss and hardship.

In Glasgow, in the year 1900, plague was dicovered at 57 Thistle St. by a doctor doing his work among the poor. This man belongs to the unknown heroes of the profession who quietly and adequately do their daily duty, and when the search-light of danger strikes their path, it only shows what good work they do in the dark. There was no panic. The doctor knew what to do. The practical Glasgow bailies congratulated themselves on the good chance the plague gave them to compel people to clean up the worst parts of the city.

Panic never pays. So far from protecting, panic actually renders people more liable to take the very disease they dread. The tradition of courage which our race has inherited is one of the most precious of our common possessions, and it is with courage and common sense that we should face the situation that sickness brings about. There are ways of protecting ourselves from every contagious disease. When we know the *cause* of the *disease*, we can almost always use that knowledge to protect us from taking that disease. Is it tuberculosis? The sputum is the cause of danger, both to the patient and to others. Burn, boil or bury, the sputum and anything that the sputum has touched, keep the patient clean, let him live in the open air, do not let him use linen handkerchiefs, but only paper handkerchiefs, or cheesecloth that can be burned, and you need not be afraid. A little learning has been a dangerous thing in the case of many people who have learned a little about tuberculosis. It has made them unreasonably panic-striken. They have been afraid of the poor patient and have driven him out as if he were a leper. There is no need to be afraid of a patient who has tuberculosis, if he is clean and careful and intelligent about the simple precautions mentioned above. There is great need to be afraid of the lack of care and cleanliness in caring for patients who have tuberculosis. Of course such a patient should have a separate room. Or is it smallpox? That is another disease of which people have a great terror. Yet we have an absolute protection against it. Those who have been vaccinated in infancy, and vac-

cinated again when about twelve years old, and then are vaccinated when they are exposed to smallpox, never take smallpox. No need for panic. But we have enjoyed for years the freedom from smallpox that vaccination gives, and we have forgotten as a people what a scourge smallpox is, and, therefore, we are neglecting vaccination at present, until the next epidemic of smallpox comes to teach us over again the reality and the necessity of the protection that vaccination, and vaccination alone, can give.

One more point about transmissible diseases is that they are, by their nature, preventable. If a disease can be contracted only from a patient who has it, then all we have to do is to care properly for those who have the disease and protect others from taking it from them, and the disease will grow less and less frequent and finally disappear. This has been done in Ontario. In 1900, 3,483 persons died of tuberculosis in Ontario. In 1904, (the latest returns we have), 2,877 persons died of tuberculosis. An annual saving of over 600 lives is the result of our united efforts against this disease. And what has been done to lessen tuberculosis can be done to lessen any communicable disease.

SOCIAL RIGHTS AND DUTIES OF FARMERS.

By Mrs. J. W. Bates, Broad Ripple, Indiana.

Garfield said, "It is not so much at what school you are educated, but how you are educated." Influence, education and opportunity are the principal factors in the broadening and expanding of liberality and equality amongst the leading people, the farmers. Farmers are the solid men of the country. They pay about one-half of all the taxes collected, and rightfully should be consulted on all questions of vital importance to themselves and families. You, as a class of citizens, are the most law abiding people of the land; your mercantile pursuits are in the hands of honest men; your sons and daughters have utmost confidence in your counsel and advice, and your women are the purest women of the nation. As a consequence you have not given your time to think of the momentous influence you daily exert over the social world. Perchance you have been in a lethargy; you have not heard the hue and cry for freedom from the restraint of social formalities. But when we see the seething whirl-pool dashing against the crumbling rocks, and hear the voices, eloquent and pathetic, pleading and earnest, we, the farmers, must man the life-boat and out to their rescue.

We do not realize the influence we sway in the daily pursuit of the aggrandizement of wealth; we are prone to lose sight of the influence of greed. In this mad race we do not hear the wail of the orphan, nor see the tear of the widow, nor feel the pangs of hunger as the gambler's wife pleads for alms. True! we do not directly feel the throb and surge of Wall street; we are not directly under the influence of Tammany Hall; we are not risking our all on the Chicago wheat pit, but what sound was ever uttered but it echoed back from the distant hills? What tide ever went out, but in course of time came back? What act was ever committed, but in after years we reap as we have sown. Knowing these things, there is no excuse from forming a movement that will end in the greatest emancipation of man that has ever been achieved.

The farmer's home is the place to educate the public, and the place to begin is around the fireside. Strip your information of technology, put it

in such a way that mothers and children can understand it, and you have achieved a victory.

When you prune your young orchard, no one, but one who is thoroughly acquainted with the art, is allowed to cut the tender twigs. If you hire a hand to sow the wheat, plow the corn, you request some recommendation as to his qualifications as a farm hand, and you insist that he is kind to the horses. If you have a young horse you wish to train for a family driver you do not trust your disinterested neighbor to train him, but guide him with tender hands until he is perfectly gentle and fears nothing. But when the children are sent to school, do you inquire if their teacher is kind and thoughtful, if you would be willing that she would mould your child's life? No, you trust to the trustee or school-board for that information. It is right that you should have confidence in that official, but which is of more importance, the pruning of tender trees, the securing of a man of work, the training of the horse, or the training of your children to be noble men and women? We are surrounding our children with influences and environments that have tendencies to dwarf and narrow their mental conceptions. We see the little pinched, dwarfed faces dodge the policeman on the alley, and hear the shrill, falsetto voices shrieking in fiendish delight at some supposed pugilistic attack, and inwardly we wonder where so many noble young men as we have come from.

I heard a mother say to her young son, who was of a nervous temperament, restless and impetuous, as he played around her as she prepared the evening meal, "You are the meanest kid that ever lived." No doubt she was tired with the day's work, but that was no excuse for her to bruise the feelings of the child in that manner. I never hear her speak of her child in any other manner; it was served to him morning, noon and night; it was the little prayer at his bedside. I fancy I could see the little Paul, as he climbed the old stairway in his nightrobe, without a goodnight kiss, and when in the old trundle bed, he wondered who it was that smiled at him so kindly as the stars shone through the window, and the next morning he would creep up to her and say "Mother an Angel kissed me last night." This is no idle fancy of an artist's brain to be placed on canvas, hung in an art gallery, and gazed at by the idle throng that passes by, but is an actuality and a reality, and is being enacted in thousands of our homes to-day.

Do you realize that the reform schools are full of boys whose home training has been just as the one described. There they are placed with different nationalities and different characteristics, from the shrewd, sharp eyed boy who cheats from his first game of marbles, to the boy who steals the rosy-cheeked apples from the merchant's barrel on the side-walk. Sometimes it is a query in my mind as to which is the greater evil, for the boy to commit the theft, or for the man to place the temptation before the child. The will-power to overcome temptations must be cultivated the same as all other virtues, therefore how can you expect to cultivate those virtues without the necessary encouragement?

When Garfield went to the Williams College he wrote to a friend what it was to be under the influence of that marvelous personality, Mark Hopkins. He felt the need of personal contact with a character of such value.

Frozen music may charm the ear, but it sends no cord of sympathy to the soul. Petrified religion may satisfy our pride in the dim cathedral halls, but it sends a death chill to the dying gladiator. The world does not need beauties of form, but ministries of love.

Society is responsible to a great degree for so many criminals. They drink the froth and foam of evil gossip, and do not consider the full value of true manhood and womanhood.

If these evil tendencies that are manifesting themselves so strongly among our people are to be checked, and the glory of our ancestors to be preserved, the result must be accomplished through the influence of education, and home rule. We cannot expect government rule to exist when home rule is so lax. Not the rule of the rod of iron, but of love and kindness. Those who go out from our farm homes must show, by their living and integrity, by the amount of energy which they display in the pursuit of the higher and nobler objects of desire and daily living, and by their power to do good service to the world, a contempt of all things that have a tendency to demoralize and wreck the manhood and womanhood of our country.

What the farmer needs is not to be made contented with the present social conditions, but made to think, to look out and ahead, grasp all good, and give freely, for much has been given and much is expected of you. The Golden Age is yet to be, Man has not fallen, he is rising. Misery and evil are not phantom pictures, but first must be understood before they can be eliminated. The harmony of the universe still has a great amount of work for you to achieve, and never will your ideal be made real by lazily sitting back in your chair of rest and ease, with the belief that all is bound to end well. Let your ideals be so high you can never reach them. The person who reaches his ideals at the age of thirty-three is an entire failure. The men that dream dreams, see visions, that build castles in the air, are the ones that must help forward the World.

"It is they
Who utter wisdom from the central deep,
And listening to the inner floor of things,
Speak to the Age out of Eternity."

Behind every great and popular movement of history, and every cause that has made its way, there has been some finer sentiment to inspire men's purposes, and fire their imaginations. Difficulties, afflictions and discouragements have been the key by which the greater number of successes have been achieved. "The Last Hope" could never have been composed unless Gottschalk had sorrowed and suffered. Byron needed his beloved Mary to complete his life, but without her he became famous. Phoebe Cary sings her songs of inspiration by faith, as she never beheld the beauties of the world. Milton's "Paradise Regained" was written with the hope of regaining his vision in another world; we would never have enjoyed David Harum if the author had not been sent to the moutains to regain his health. Gray was seven years writing the "Elegy of the Country Churchyard." George Elliot read nearly one thousand books before she wrote "Middlemarch;" Webster was forty years in compiling the Dictionary. Lyman Abbott's most famous sermon was delivered after forty years of careful preparation. Bryant wrote "Thanatopsis" one hundred times and wept bitter tears because it was not better.

Some may think that these are great achievements, but true greatness means to do all the good you can find around you, and do it well. When was Garfield the greatest? Was it when he was in Congress? Was it when he was inaugurated among the fluttering flags and peals of happy bells, and hailed and blessed by the millions of lusty voices? No, he was the greatest after he had closed his famous inaugural speech, and turned and kissed his aged mother.

All honor to the man whose feet echoes to the music of his Country, whose shroud is his native flag, whose pillow is "Mother Earth." Bring our garland and revive his memory. But far more honor to the farm that

yields such lights of true living as Bayard Taylor, Horace Greely, Daniel Webster, George Washington, Robert Burns, and Francis Williard.

Several years ago there was a storm on Lake Michigan. A number of students were in a pleasure boat. The small craft was capsized, several of the old seamen feared to brave the fierce gale, when one brave lad recognizing his fellow friends, secured a rope to his waist, and amid glare and gleam, and mad tossed billows, he rescued three. Just as he was near the shore with the last one he was injured with a piece of wreckage. He was hurried to the hospital. The next morning a fellow student rushed into his room with a newspaper giving a glowing account of his bravery. "Look, Tom, look, you are a hero, a hero" he shouted. Tom, all bruised and bandaged, replied "Tell me Dick, did I do my best? If I didn't, don't tell me I am a hero."

Are we doing our best to make two blades of grass grow in the place of one, to enrich the whitened slopes, to advance agriculture to a higher plane, and to educate our children to be broad and liberal minded citizens? Then put your ear to the great store house of human nature, pick and clean the rough nuggets that come in your life and success is yours. Liberty is never so sweet to the criminal, as when he stands behind the prison bars and kisses his babe goodbye. Character is never so appreciated as when by a thoughtless step it passes us as a golden age. Life is never so precious as when we annually pass each milestone and see the shadows growing thick and fast, and as we "nightly pitch our moving tents one day's march nearer home," we realize the meaning of living near the ideals of integrity, honesty, and purity above all other men. The human life is beyond the comprehension of the brain, beyond the limit of space, beyond the calculation of time. Oh, weary not in the pursuit of higher attainments.

"O! flower on the breast of the river,
O marvel of beauty and grace,
Did you fall right down from Heaven
From out the most beautiful place?

Your heart is as pure as an angel,
Your face is steeped in the sun,
Did you grow in the radiant city,
My pure and holy one?

'Nay, nay' said the lily
None gave me saintly white.
I grew in the darkness,
Down in the dreariest night.

From the ooze of the slimy river,
I won my glory and grace,
White souls fall not, O my poet!
They rise to the highest place."

HOUSEHOLD HYGIENE.

By Mrs. B. S. Shannon, Toronto.

Health is such a blessing that the individual who devises means to preserve it or to restore it when lost, is deserving of all the gratitude and honor that a community can bestow. Unfortunately there are very few who estimate life at its true value, until they are confronted with the grim destroyer—Death. No one can fully appreciate the priceless blessings of

health until he feels it has slipped from his grasp. "Health is Wealth." This is truly an expression of wisdom.

The great need of the present day is adequate instruction in hygiene and physiology, that humanity may not only know how to secure the restoration of health when lost, but, by attention to physiological and sanitary laws, may retain good health indefinitely.

The hygienic essentials for good health being sunlight, fresh air, pure water, proper food and exercise, we cannot do better than consider these separately.

Sunlight is essential to life. Its rays stimulate the growth of every living organism and there is no doubt but that they exert a chemical action upon living tissue with which we are as yet but imperfectly acquainted. Sunshine is necessary to robust vigorous health. It is a tonic that has no superior. Do not be afraid to let the sunlight, especially the morning sunlight, penetrate your homes. Of course, it is not necessary to have the sun's rays streaming in through every door and window the whole day to destroy the carpets and draperies, but sometime during the day throw open the entire dwelling. Sunshine is the best disinfectant. The bacterial effects are only beginning to be understood, but, if you desire a healthful dwelling, let God's bright sunshine freely and frequently penetrate every corner of it. If we were selecting a building site, we would like to have it on a gentle slope facing the south or southwest, with the living rooms facing the south or south-west, as the part of the house we are in the most is where we want the most sunshine. We would naturally avoid a swampy locality where there might be malaria and where it would be difficult to have proper drainage. We are not like flowers, absolutely dependent on light, but we must have plenty. A physician in New Orleans during one of its epidemics reported more than six times as many cases of yellow fever on the shady as on the sunny side of the street. In connection with a good many hospitals and rest homes, they have sun parlors, just where the patients can sit and have the sun rays fall on them. Sunshine is cheap and yet such a blessing. Let us have plenty of it.

Why do we need fresh air? Why ventilate our homes? Because we have to breathe and in breathing we use up or spoil the air. Air consists of about four-fifths nitrogen and about one-fifth oxygen. One man uses 3,000 cubic feet per hour; hence the need of constantly replenishing the air in our homes, especially at night when Nature does her great repairing work, when she is busy making good the ravages of the day, replacing the waste by building fresh tissue.

The Egyptians understood the need of ventilation and built passages in the interior of the pyramids. We cannot live without air. Take for example the "Black Hole of Calcutta," where so many people were shut into a small space over night. The next morning they were nearly all dead. We not only need air, but to be healthy, we must have pure air.

There is a certain amount of fresh air entering our houses through the doors when being opened, but that is not sufficient to keep the air of the whole house fresh. We need to open the doors and windows and have every part of the house aired frequently during the day. In the winter we need to watch this more carefully. Fresh air is more easily warmed than impure air, so do not think you are extravagant. In the summer the windows and doors are naturally open more. Especially, have the air of the living room, whichever room that may be, as pure as possible, and of the kitchen too, where we women as a rule have to spend a great deal of our time. Several people cannot be in a room long without the air becoming close and

it has the effect of making us drowsy and produces headache. Let us cultivate deep breathing and breathe through the nose. We need to watch this with small children.

Let us watch our sleeping rooms, very carefully, to have them well supplied with fresh air all night. We can do this by having the window open top and bottom and placing the bed so that there is not a draught. Sleeping in the underwear worn by day, is a very unclean habit, as the clothing becomes covered with particles of the skin removed by constant friction of the clothing, and also somewhat saturated with perspiration which is going on constantly, although we may not always be aware of it. Throw open the bed upon rising. The mattress and bedding should be aired as much as possible and the room left at least one hour to air before the bed is made.

Let us try to see that the schools, where the children spend so much of their time, are properly ventilated. A child kept out doors a great deal becomes strong and is less subject to disease than one closely housed. Our churches and other public buildings are often very poorly ventilated. I knew of a case where a concert was given in a hall where the air became so foul that the lights nearly went out and the people who were in the building were sick for days, showing that impure air is poisonous to our systems.

Besides making the air impure by our breathing, impurities often come from the cellar, decayed vegetables or dampness being the cause. Cellars should be cleaned early in the spring and kept sweet to keep the air of the rest of the house pure. Accumulations around the house or in the yard, will make the air impure before it reaches the house, hence we must keep our yards clean and remove all wastes. Care should be taken to keep sinks clean and sweet. The air in the house should be as near like the outside air as possible, without draught and sufficiently warmed in winter.

Pure water is another essential to health. Three-fourths of the body is made up of water. One-half ounce is needed daily for each pound of our weight. This is got from our food—vegetables, fruits, meats and beverages. The purest form of water is derived from vegetables and fruits, next to that of distilled water. Spring water is a great boon, if it can be kept free from contamination. If wells are used, they should be cleaned every three months and should never be placed near buildings. Be careful never to throw wash water of any kind near a well, as it is likely to come in contact with the well water and render it impure. Disease is sure to follow where impure water has been used.

Our diet has a great deal to do with our health. Good plain wholesome food well cooked is much better than a lot of fancy dishes and pastry. Our diet should be suited to our climate, age and occupation. A man in a cold country working out of doors needs much stronger food than an office man in a warm climate. A growing boy will naturally have a more ravenous appetite than an elderly person who exercises very little. A man doing manual labor will need more food than one whose occupation necessitates his having very little exercise. Children should have very simple diet, lots of milk, eggs, vegetables, bread, porridge, fruits and sweets, but very little cake, pastry and meat. The sweets should be the purest and given after meals so as not to destroy the appetite for other things. Regularity with meals is very necessary, most particularly with children.

We all need exercise to keep the body in a healthy condition and housework is as healthy exercise as any, if we can do it in pure air and keep the body erect. Where a person's work does not call for exercise, he should take walks, breathing exercises and engage in out door sports to bring every part of the body into practice.

Thus far we have spoken most of the hygiene of the home; now let us consider our bodies, the skin, eyes, ears, teeth and hair.

The skin is in two layers called the epidermis and the true skin. There are two skin glands, one to supply oil to keep the skin soft and prevent the hair from becoming brittle, the other is the sweat gland through which impurities from the body pass off constantly. If the pores of the skin become closed, it affects the health, hence the need of frequent bathing. Among the white races of the earth the English are the greatest devotees of the daily tub, to which custom their ruddy complexion is largely due. The skin is such an important excretory organ that the importance of keeping its innumerable outlets free from obstruction cannot be over-estimated. We know it will be urged that the majority of people have not time or convenience for frequent bathing, but when sickness overtakes them they have to find time to submit to medical treatment, and in this as in other matters of every day life, the cleanly individual who is thoroughly in earnest will find a way or make it. Hot baths are necessary to thoroughly cleanse, but the cold baths are powerful stimulants. The best time to bathe is immediately upon rising or a couple of hours after a meal or just before retiring. The man who is reported to have said that he took a bath once a year, whether he needed it or not, would hardly fulfil the requirements of ordinary civilization, not to mention hygiene.

We often abuse our eyes by reading in a poor light or in cars or by reading very fine print. Fine print should not be allowed in schools, and great care should be taken to watch short sighted children so that their sight may not become worse. A baby's eyes should be carefully guarded against strong light.

Be careful in washing the ears not to allow any cold water to enter them. The wax should be carefully removed from the ears, as it often collects in such a quantity as to affect hearing. It is especially necessary to watch children in this matter.

The first step in digestion takes place in the mouth, by the mastication of the food by the teeth, hence they should be kept in a clean healthy condition to prevent impurities mixing with the food. All cavities in the teeth should be filled as soon as they appear and other necessary care given the teeth. A person should go regularly to a dentist every six months or once a year at the longest. Keep the tartar removed and clean the teeth once a day at least with a brush to prevent food lodging in and around them.

When the hair becomes oily and dust accumulates, it should be washed (about once a month) and the head massaged to keep the scalp in good healthy condition. Vegetable foods, especially carrots, are very good for the hair.

We have an example of the effect produced by the obedience to Nature's laws, in the vigor of the Japanese soldiers during the recent war with Russia. No army ever went through so severe a campaign with as little disease as did these little defenders of the "Sun Rise Kingdom." What was the secret? They were accustomed and trained to drink plenty of pure water, to eat simple food and less of it in proportion than we Americans, their diet being mostly rice and fish, and, moreover, their houses are so flimsily built that the outside atmosphere freely penetrates them.

Pure air, pure water, sunshine, proper food and exercise are all necessary to our well being, but there is still something very necessary, pure thoughts. Keep the mind pure and not self-centered. There are enough sad things in life. Let us try to constantly think of the bright things for which we have reason to be thankful.

HOME DECORATION.

Mrs. Lilian Gray Price, Toronto.

Probably no art has so few masters as that of decoration. In England Morris was for many years the great leader, but among his followers no one has attained authority, and in America we are still without a leader. Yet in spite of this lack we have learned that the art of decoration is dependent upon building and architecture, and is bound to follow the principles which govern them.

Even in the absence of training it is astonishing how much we have of good interior decoration not only in the houses of the wealthy, but in the homes of people of average fortune, and when the fact is once recognized that beauty—like education—can dignify any circumstances from the narrowest to the most opulent, it becomes an object of life to secure it.

Our houses should represent our individual tastes and habits, and it is expected that a woman's home shall be an appropriate and beautiful setting for her personality, a credit to her husband, and an unconscious education for her children. A beautiful home is undoubtedly a great means of education and of that best of all education which is unconscious. To grow up in such an one means a much more complete and perfect man or woman than would be possible without that influence.

But a perfect home is never created all at once, but grows, and every book, every picture, every carefully selected object brought into the home adds to and makes part of a beautiful whole.

Of course, if we build our house, we have the advantage of putting into it our individual ideas and tastes, and can thus lay a good foundation for interior decoration, but most of us are obliged to adapt ourselves to the builder's idea to a great extent, and this makes the problem more difficult. We may have long narrow halls, narrow rooms and high ceilings, or broad rooms and low ceilings, many difficulties to overcome.

However, although the house is a matter of construction, its general interior effect is almost entirely the result of color treatment and careful and cultivated selection of accessories.

Harmony or the want of harmony in color forms the all pervading atmosphere. Unity must be sought for, forming a quiet background for our daily lives and unconsciously shaping our thoughts and feelings. Nature is full harmony and never makes a mistake. Let us learn from her. Color has been aptly called "the music of light," because just as we have ascending and descending scales of sound and harmony and discord in music, so in color we have ascending and descending scales of light, harmony and discord.

Consider then the harmony which must exist between the room and its furnishings. Sometimes rooms are out of proportion, too large or too small, while sometimes we have to make a dark room appear as light as possible, or to subdue the glare. Color is the most powerful remedy.

We know that the primary colors are red, blue and yellow, and the secondary are purple, green and orange. Yellow and orange will bring warmth and sunshine into a room. Green and red with their tints, unless too dark have little effect in changing the light, while blue may be used in a bright room. In other words, the warm colors are yellow, reds, red browns, and olive green, and the cold colors are blue, blue green, purple, gray, and neutral tones of the warm colors.

The same color should appear three times in a room, with the darkest shade on the floor, next on the wall and the lighest on the ceiling. One done in greens, or one color would make "simple harmony," while one done in contrasting but harmonious colors would give "harmony of contrast."

We seldom use the spectral colors, but we soften and neutralize the background tones, and in selecting colors select those with the same quality as if the same neutral tint had been introduced into all the dyes. Observe carefully the flowers, spring, summer and autumn, birds, butterflies all of which are rich in color combinations which can be adapted to interior decoration.

So much for color. Now a word might be said about appropriateness. Get things that are appropriate or suitable to one another, and fit all together so as to have such completeness that it is possible to go from the top to the bottom of the house finding everywhere agreeable, suitable and thoughtful furnishings, and combine utility with beauty.

It would be impossible in a paper of this kind to even mention the various branches of home decoration, so we must confine ourselves chiefly to floors, walls, draperies and pictures, because these are the first and most important things to consider.

The decoration of the walls furnishes the room as much as anything, and here again we must consider color with reference to light. A north room will require warm and bright treatment, but a room facing the south similarly treated would produce an almost insupportable brightness. It should have cool light colors, blues, water-green, and silvery tones to contrast with the yellow of sunlight. The decorator should remember that the color used on the walls governs everything else in the way of furnishing, such as rugs, curtains etc. Thus it is necessary first to consider the taste and feeling of the occupant, exposure of the room and use of it, then having once decided on this part we may choose tints according to personal taste.

In submitting a paper for publication one is forced to forego the pleasure and advantage of illustration and demonstration by means of samples of wall papers, but there are a few rules one can follow. In hall paper or wall decoration of any kind in this part of the house, we wish to give dignity, and make it a fitting entrance to the various rooms. In the drawing room we may use a dainty paper and one to give the impression of elegance and space, while in a library the paper should be unobtrusive, as we go there to study the books and not the walls. In the sitting or living room we wish to give the effect of intimacy or close family life, and can use a more lively, cosy design, and in the dining room utility and every day service has generally to be thought of in combination with beauty.

In the ceiling it is best to use the lighest shade of color and should reflect light into the room. A ceiling of cream white will harmonize with almost any tint on the wall and also gives the effect of air and light.

In the rugs we try to have a certain amount of contrast to give life and snap, yet harmonizing with the walls, or we may use a decided contrast, as copper colored walls and softly toned green carpet. Green is considered a safe color, as the authorities tell us we are liable to make fewer mistakes in the use of green than of any other color.

In curtains and draperies fancy may run riot. These have more to do with the atmosphere of the room than chairs or sofas. Chairs are sat on and pass from the view, but draperies, like pictures, hang in everybody's sight.

A room having good color, attractive and interesting pictures, and beautiful draperies is already furnished. Here also color is the first thing to remember. It may follow that of the walls or may be white. With plain walls figured draperies are correct, while figured walls call for plain draperies. We use soft pliable materials and straight lines, and a general plastic rule is net curtains with rich portieres downstairs, and muslin and light curtains upstairs. Stencilling which is coming into vogue is economical, serviceable, and attractive and may be used on cheesecloth, grass linen, Russian crash, silk, denim or velour, is within any women's realm of hand work, and will do much towards solving the problem of artistic curtains and draperies.

The selection of pictures is a most difficult one, but they add the last definite note of individuality and beauty to the home. First comes the question of weeding out the old ones, and we have to slowly and gradually put the offending one in less and less conspicuous places till we at last land it in the store room or attic with its face to the wall, without a shock to anyone's feelings.

Then comes the selection of new ones. Only the favored few can afford to have the originals of good pictures, but we all can get prints and photographic reproductions of art treasures of both the Old and New World. For a small expenditure we may have the Cosmos prints, or the Perry pictures, while for a little larger outlay we can obtain the Copley prints which are rich in color, artistic and satisfying. Our selection is unlimited, but, unless we have confidence in our own taste, it is best to choose copies of the world's art treasures. Whenever opportunity offers to go through art galleries, or to study a collection of good pictures wherever they may be found, to learn something of the different artists, how they came to paint certain pictures, and how really good art may be brought into the home, there opens up to us a new world of delightful study and pleasure, little thought of by many people.

After a selection of subjects has been made there is the framing and hanging, which require thought and care so that we may do full justice to the picture itself. The inclination is to hang pictures too high; the guiding principle should be the level of the eye. If the pictures are large and hung one in a place, it is a simple matter to arrange them, but in grouping it will be found that a large picture, strong in detail, with smaller ones around it, will give the best result. Relative size, color, shape and even subjects have to be considered. But is it not all very much worth while, to show in the pictures upon our walls, as far as our money will allow, that we can appreciate the artistic as well as the practical in our home?

In a closing word, let me quote from Candace Wheeler:—

"It is by no means an unimportant thing to create a beautiful and picturesque interior. There is no influence so potent upon life as harmonious surroundings, and to create and possess a home which is harmonious in a simple and inexpensive way is the privilege of all but the wretchedly poor. In proportion also as these surroundings become more perfect in their art and meaning there is a corresponding elevation in the dweller among them . . . since the best decoration must include many spiritual blessings. It may indeed be used to further vulgar ambitions, or pamper bodily weaknesses, but truth and beauty are its essentials, and these will have their utterance."

HOUSEHOLD EXPENSES.

By Miss Bertha A. Duncan, Emery, Ont.

It is often puzzling to know just how the housewife can plan and economize to make a small income meet the mutiplicity of household expenses, and thus keep her home out of debt. Even though the house is free of debt there is still food, clothing, fuel, service, taxes, church expenses, an occasional trip or a good concert, all of which may be justly included in the expense account of a well ordered family.

Taking it for granted that his wife is a good manager, the husband should give her a liberal allowance for household expenses. The proportion of the income to be devoted to this should be decided after carefully considering the needs of the household and the wisdom of providing for a "rainy day." Knowing just how much she has to defray expenses, she will plan to make her funds go as far as possible, and there will be much more harmony than in the home where the wife is obliged to ask for every small amount as it is needed.

It has been said and wisely too, that "No man is rich whose expenditure exceeds his means, and no man is poor whose incomings exceed his outgoings." We find that all business men who succeed, keep an account of their expenses and their receipts, regularly balancing these accounts to know where business stands. Will not the same apply to household expenses? Yes. In country and village homes, there are many who have poultry, milk, butter, vegetables and fruit for sale. Would it not be well to have an account book—it does not cost much—and enter every item in connection with cost of production and proceeds from same, in order that she may know the exact profits? If the account indicates a loss, let her look to some one who has had experience along that line of production, that she may turn the path of failure into one of success.

Be businesslike. If the living expenses of the home must be met by the efforts of the housewife in her garden, dairy, etc.—and it is by no means just that she should not receive some allowance from the husband too—some estimate of the value of these should be made in the expense account; and by examining the items carefully from time to time, one will be surprised to find in what ways expenses may be kept down. Many times we buy what we really do not need and by looking over the books and finding in black and white the actual cost of such articles, we are led to inquire if we are getting the best possible value for our money. Some say, when asked if they keep an expense account,—"Why no, I haven't time!" True. It may take a little time, but when one considers that very often the allowance has been spent before the allotted time, and there is no means of accurately accounting where it has gone, is not this sufficient reason for keeping a record of expenses?

It is never wise to spend the last cent of an allowance if it can possibly be avoided. There sometimes comes a "rainy day" and if we live beyond or even up to our income, it will cause us more discomfort than economizing and living within its means when we have health and strength. While the millionaire enjoys more comfort than the man with a few thousand a year, still it does not follow that the day laborer may not have more happiness in his small home like dwelling than they who live in luxurious mansions.

Children, when quite young, should be taught the value of money. It is wonderful how quickly they will learn. At first, their desires are centred

in the large bright copper, but the silver five-cent piece soon becomes more fascinating. Personally, I think the small bank is of great value to children and that, when children are taught to save money, all sums borrowed for household or other expenses should be promptly returned. Otherwise, the child has no encouragement to bank his pennies. Give the child an interest in the garden or let him keep some chickens, and, if you do this, let him have his share of the profits. Do not be like the man who gave his son a calf to care for as his own, but when the calf became a cow, sold her and put the money in his own pocket. If the child has spending money, he should be taught that under no consideration should he purchase an article which is beyond his purse. It is better to sacrifice the pleasure the article might give, than to go in debt for it. By inculcating good habits in youth, there will be little tendency to fall into bad ones in later years.

By economy and good management we can derive the best results with the least expenditure of time, money and energy. Too often we rush at our work without planning it. By often repeating this foolish practice, we soon find ourselves unable to control our nerves, and finally a doctor's bill has to be paid and many other expenses are incurred, such as wages for help, etc. What a wonderful saving there would be if we only would take time to think before acting. A few moments of thought would save much time and worry. Our work might often be better planned, with the result that we could enjoy a visit with a neighbor for an hour with a good book.

Economy does not mean that we should be misers, hoarding money for money's sake. It means more than the saving of money. It means good management in little things, and if we are not careful of little things how are we to manage the large things?

A few years ago living was much cheaper than it is to-day. Cuts of meat which now cost us fifteen or twenty cents could then be purchased for eight to ten cents, and there is a corresponding increase in the price of many other food materials and also in clothing.

While a small family cannot purchase to such advantage as a large family, still the thrifty housewife can store her larder with staple foods and secure the more perishable ones by an occasional trip to the market. By selecting her own food stuffs, she can obtain a much higher quality than by telephoning or giving her order to the grocer or butcher. Although dealers should be competent judges of their goods, still we cannot rely on their selection, because what one person considers a good brand, another might consider inferior. The woman who buys only after personally inspecting the goods has a greater choice and can often substitute foods to give greater variety and perhaps at a smaller cost.

Probably the best place to purchase poultry, meat vegetables and fruit is at the market. These products are brought in fresh every market day and we can rely more on their quality than when we purchase them at the stores, although even there we must be on the look-out for deceptions, by knowing the quality of the genuine article. Marketing should concern all housekeepers. More particularly in towns and cities than in country places, do we find women who are always on the alert for bargains. Bargain day is like everything else—it has its advantages and its disadvantages. For the well informed, it may be all right, but for those who know nothing of quality, it is treacherous ground to go in search of bargains. An article not needed is *dear at any price*.

This is true of food also. Our bodies are composed of substances similar to those found in the animal and vegetable kingdoms and the various articles of food serve as fuel to keep the body in working order. But we require

some knowledge of the composition of different foods and the use they will be to our body, as well as the influence of climate, occupation, etc., on the foods necessary to the body. By observing these points the general health of the people would be greatly benefited. With a better knowledge of the composition of foods and their uses in the body, we will not be tempted to pay exhorbitant prices for foods yielding relatively low fuel value, when our income compels us to get the best results with the least expenditure.

In the model kitchen there is no waste, but how often do we find such? Sometimes the excuse is given that the dog, chickens or pigs eat the scraps, and therefore they are not wasted. Do such people stop to consider whether or not such particles of food are of any value to the household, and whether it is the most economical food for the chickens? No, they have not yet learned the value of money, or there would be many appetizing wholesome and nutritious dishes prepared from these apparently. useless scraps.

How many realize that the water in which vegetables have been boiled contains valuable mineral matter so necessary in our systems? The liquid drained off the vegetables is often thrown away instead of being saved to combine with left over vegetables and milk to make a delicious soup. Particularly does waste in the kitchen apply to foods, although it is also true of our time and energy, as well as of clothing. Much time is wasted through lack of planning our work. There is an old saying that "A woman can throw out with a spoon faster than a man can throw with a shovel," and in some instances perhaps there is some truth in it, but as Women's Institute workers we must prove that this cannot truthfully be said of us.

We only journey through this life once and why not enjoy it? There are so many tempting ways of preparing the more common foods and using the left-overs that there is no excuse for having foods appear on the table day after day in the same unappetizing manner. With a large family there is greater scope for variety, but, even with a small family, variety can be secured at a moderate cost for each person.

The careful housewife will be on the watch for practical labor saving devices such as granite pots, white enamel ware, sink, rolling table, meat grinder, wringer (which may take the place of a mangle for coarse towels, sheets, etc.), washing machine, etc. A well planned house will save steps and labor. Another important labor-saving device is a well trained husband or son who will wait on himself, as well as make an effort to help the wife or mother.

The woman who studies food values and economies and applies them scientifically, who keeps her entire household expenses within her income, makes home free of debt, is happy and self-reliant, is lifting the standard of her nation.

HYGIENE AND NOURISHMENT.

By Dr. Annie Backus, Aylmer, Ont.

Imperfect nutrition constitutes the commonest form of disease, and furnishes the most frequent cause of disease in infants. Many thousand children die yearly in London alone, for the simple reason that they are fed systematically and persistently upon food they cannot digest. "And so long as the children of the poor (or of the rich) are allowed to leave their schools utterly uninformed as to the duties which in after life they will be

called upon to fulfil, so long this dreadful mortality may be expected to continue." So wrote that great specialist, Dr. Eustice Smith, several years ago. And yet this great problem remains unsolved, and in Canada, as well as England, men, women and children are, from lack of proper knowledge concerning these subjects, eating articles which are not foods, and drinking substances which cannot possibly contribute to nourishment.

It is a very important matter, not only from the standpoint of the philanthropist and reformer, but from the political economist's point of view as well. A feeble people, sickly, unable to attend to those every day duties of life with ease and pleasure, must of necessity be a discontented people, and, eventually, a poverty-stricken people. It is all very well for the poet to sing, "From labor health, from health contentment springs," but without proper food, health cannot be attained, and the feeding of our children is, to-day, a problem, the correct solution of which means the strength and welfare of the coming race.

The introduction in the market of all sorts of patent foods (and, as we are sorry to say, many of them by some physicians), the catchy advertisements, the ease of preparation, and all these inducements make us forget the homely nourishing foods of our own production. Many of these patent devices are certainly attractive in appearance, and some of them pleasant to taste, and we all know that the appearance of the dish adds or detracts from its nourishment, but you must have some nourishment to begin with. No word in the English language has been so abused as the word "food." We call everything we put in our mouths to eat either a food or a medicine. Now, a food should mean something to nourish, to build up the body, to repair waste, and we who are undertaking to look after the catering for the family are much mistaking our duties if we do not inform ourselves as to what are foods, and what are simply inert substances, or worse, something absolutely deleterious.

The feeding of children is a question of so great importance that the wonder is why young women are not taught in our schools something about this. We find boys and girls in delicate health because they are not properly nourished in infancy, and we find these same boys and girls unable to assimilate enough nourishment on account of the fact that in infancy they received a food quite unfit for their immature alimentary canals and which afforded no nourishment at the time given, as the digestive organs of the infant were not prepared to use food of that nature, yet struggling to do the work placed upon them, they were worn out on a useless job, and unable to perform, except in a half-hearted way, the processes of digestion and assimilation. There is no question in the world about which women are more "touchy" than this one of feeding their children, and often it is only after convulsions or gastric fever that they listen to the idea that the babe should not sit in the mother's lap at the dining table and partake of each and every course.

It is so different to consider remote consequences, or to deny ourselves a present pleasure on account of a future discomfort. Yet, if mothers would realize that they were laying a foundation for ill-health, possibly establishing the onset of some wasting disease that would end only by death, how differently they would listen, and how anxious they would be to find out a natural, and being a natural way, a scientific way of feeding the growing child. Nature is always trying to show us how to do things.—Just see in the little babe. How must we feed it? Look at its toothless gums, watch its sensitive stomach, consider what a trifle upsets its bowels—a draft of air means laryngismus stridulus—a slight cold means membranous croup.

Nature says, here is a little creature to be taken care of and *gradually fitted* for life's hardships. First, it must have mother's milk, if possible—nothing else. Then the milk from a healthy cow, diluted with barley water, oat meal water or rice water. At one year the child should be allowed potatoes mashed carefully with butter or gravy, broths, eggs, puddings, remembering always that the child from the first must have pure water to drink. Now at the sixteenth or, better, eighteenth month, meat may be given. Let it be carefully prepared, ground or pounded. Teach the child to chew its food. At first it will not do so, and until it does let the meat be ground fine. Mutton and beef are best. The child at two years should have four meals per day—and no piecing. Meat should never be given in large quantities, as it is too stimulating and causes the child to be irritable and nervous. Do not allow a child to eat at all hours, and nibble in between meals. If it has fruit (as it should), let it be taken at meal time—preferably at breakfast, if the child is at all constipated. One great lesson children should learn just at this period, is to restrain their appetites. If a child see something—a peach, for instance—and wishes to eat it at once, do not allow it to do so, but keep it until meal time; candies, keep them for dessert. Self-restraint learned at this time is a great armour against the temptations of the future.

In preparing foods, the first point should be, is it nourishing? Second, is it suitable for the requirements of those partaking of it? Third, is it being prepared in a way most acceptable to the palate?

Then again, we must watch the members of the household. Are they doing well? as the farmer says of his stock. If not, seek for the cause. Where is the trouble? Food, ventilation, raiment, moral surroundings? Carl Vogt says, "If we are to devote our attention, before all things, to what can be measured and weighed, the living man is the first object which demands our investigation." Have a scale handy—let us watch the gain and loss in flesh of different members. Keep track of chest measurement, of height in the growing one. Watch the pallor or flush of the skin. The disposition too is giving evidence of what is going on within. As good and evil are ever at war with one another, so is disease with health, and as the country grows, with increased population comes conditions unsanitary. Eternal vigilance is the price of health, as well as of everything else worth having. But start the child right, mentally and physically, and, other things being equal, it will never get far away from the road of health.

DIETETICS IN HEALTH AND DISEASE.

By Miss Julia McIntyre, Springfield, N.B.

Although the preparation of foods is one of the oldest of the arts, only within recent years have any serious attempts been made to place diet and dietetics upon a proper scientific foundation. Based as it is upon physiology and chemistry, it is impossible to secure the rational treatment of food, without at least a slight acquaintance with food-stuffs in general, with the chemical and other changes induced by cooking and above all, with the subsequent course of the food within the body itself.

Having acquired this general knowledge, one of the most necessary phases of the study, is the application of a diet, suitable to people under different circumstances. This has been much neglected, and is very neces-

sary if we wish to have a people strong and healthy. Is it not the common cry everywhere, that the people as a whole are dying of indigestion? And only when a scientific planning of the every-day meals will come about, can we expect to be relieved of the great scourge.

The diet of a healthy person varies with (1) individual constitution; (2) occupation; (3) habits of life; (4) climate; (5) sex, and (6) age.

The last of these is perhaps one of the most important, although it is overlooked by many people, who imagine children can thrive on all sorts of food, instead of being supplied with a diet specially suited to their needs. By special diet I mean a diet suited to their needs, suited to the child, one made up of foods that the child can digest. How many of us have not seen a baby of some four or five months, given potatoes at the noon-day meal? One has only to glance at the process of digestion to see that the child of that age cannot digest such food. The reason is simple,—the ferment ptyalin in the saliva which acts on starchy foods, is not secreted until the child is eight or nine months old, sometimes twelve months of age.

Just here two questions naturally arise,—What is the proper diet for an infant? and how can we get it? Of course human milk is the only proper food for infants, but there are cases where cow's milk has to be used. Under such circumstances the milk must be modified so as to resemble the human milk as nearly as possible.

The reasons for this clearly appears by noting the composition of each.

Human milk.—Protein, 1.5; fat, 3.8; carbohydrates, 6.4; water, 88.3

Cow's milk.—Protein, 3.3; fat, 4; carbohydrates, 5; water, 87.7.

Thus, we readily see there is a great difference, especially in the protein or tissue builder. The protein of milk forms the curd, and the curd of human milk is floceulent and light, whereas the curd of cow's milk is rather solid, as we all know. In the process of digestion milk is curdled, being acted upon by the gastric juice in the stomach. So a first problem arises, how to reduce the amount of protein in cow's milk and still retain the fat and carbohydrate. The importance of the latter must not be forgotten as it is a well established fact that lactose (or sugar of milk, the carbohydrate) is the only sugar a child can digest with its immature digestive organs.

A second problem that confronts us is how to modify cow's milk as a whole so as to resemble human milk. In the home, perhaps one of the best methods is to allow the milk to stand for six or eight hours in a cool place, then pour off the top milk—say eight ounces (most modern bottles are marked with ounces). Add to this eleven ounces boiled water, dissolving in it two tablespoons lactose, or sugar of milk, and one ounce lime water. This is sufficient for ten feedings, allowing two ounces for a feeding. As soon as modified, it should be put in ten sterile bottles, plugged with absorbent cotton. Keep in a cool place until just before feeding; then heat by placing bottles in cold water and heating to the temperature of the body, which is 98.6° F. If a thermometer is not at hand, test by dropping on wrist, at location of pulse.

In feeding infants, it must be borne in mind that the stomach is very small. Frequent feeding in small quantities are much more conducive to the health of a child, as its digestive system may be impaired in some way. In some cases it has been found necessary to peptonize the milk, that is predigest it. Peptogenic milk powder of Fairchild Bros. and Foster, New York, has proved very successful.

The above are suggestions only regarding the feeding of infants. Whenever possible, we should give the food which nature has provided, as

mother's milk is the best nourishment for her offspring in the early period of their existence.

Statistics show that a great many deaths of children occur under one year of age, and that only 8 per cent. of these are fed on human milk.

After a child is eleven months of age, a *little* beef juice, or strained fruit juice can be given. The fruit juice acts as a laxative, and gives variety to the child's diet. When a child is one year old then foods, such as soft cooked eggs, chicken broth, pulp of baked apple, and baked potatoes may be given.

Unless the digestion of a child is very strong, it is not wise to vary diet in the third year from that of the second. In cases of very strong children, during their third year they can eat white meat of chicken, bread, sugar, and fine vegetables.

A few general rules that might prove of use in feeding children are:—

(1) Allow time for meals, at no time should the food be taken quickly.

(2) Do not tempt child with rich and indigestible foods.

(3) Be careful that the child's mastication of food is thorough. Note condition of teeth.

(4) Do not allow eating between meals, unless the child is hungry and requires food.

(5) Do not force child to eat against will.

(6) In very hot weather the food may be lessened, but in that case increase the liquid.

School children require great care and attention. The child is growing, the mind developing, and proper nourishment should be provided in order that the child may be as efficient as possible. Therefore care is necessary in selecting (*a*) kind of food, (*b*) amount of food.

The diet for school children should be mixed and have variety. Too highly seasoned food is not good as their glands are active and do not need stimulating. A child should have a good, substantial breakfast before going to school. Dinner should be of simple food, not rich pastries, but good plain wholesome food. Easily digested food should be given for supper, with as little meat as possible. Candy for children is all right in its place, but should never be given at a time when it takes away appetite for regular food.

With the adult the framework has ceased to grow, but development may not have ceased; the muscles may still change. The problem in many cases with adults is that they may eat too much, at the same time not taking sufficient exercise. Sir Henry Thompson claims that more than half of the sickness and death in later life is due to mistakes in diet. Overfeeding is bad, and nature tells us so in many forms,—one most prevalent is billiousness. With adults, as with infants and school children, one should study their likes and dislikes, as the old saying still holds true, "what is one man's meat is another man's poison." Thus we should try and adopt a diet to those for which it is suited.

During old age the functional activities are continually diminishing, digestive processes weaken, and cells lose their activity, even if general health of the body may seem good. In old age there is not the same demand for food, and it is accordingly necessary to diminish the total amount of food. Nature tells us by the loss of teeth that old people do not require foods that require such thorough mastication. Foods given should be of such a nature that they will be easy of mastication and digestion.

Animal foods suitable to old age are,—chicken, sweet breads, bacon, white fish, eggs, and other foods as stale bread, cereals, potatoes, pulpy parts of all fruits, but no coarse vegetables.

Condiments can be used in diet of old people, as their glands are flagging in activity and need stimulating. In this respect, their physical wants are the opposite of growing children, who do not need condiments.

Other conditions that influence the diet were named at first, but the greatest stress was laid on age, especially infancy. All that were named influence our diet more or less, but having once grasped the central idea in feeding at different ages, we can easily suit a diet for people of different occupations, etc. For instance, we all know that the farmer or out-door worker can eat and should have plenty of animal food—as meat, eggs, etc. Whereas, the man in the office should have lighter foods, as he is not in the same position to get rid of these foods. His body is not as active, and he consequently does not use up so much food.

Science has been described as "organized common sense," and this description is specially true of modern medicine, based as it is upon the sciences of physiology and chemistry, including under the latter, diet and action of drugs. Although in a few words it is impossible to even sketch the proper diet for each disorder, still it may be worth while to indicate at least some of the principles which will guide those persons who may be called upon to act as nurse, leaving the physician to supply the details.

The diet of fevers is one that requires the greatest of attention. In a fever of any kind two things must be kept in view, (1) to check waste of tissue, (2) and to keep up nutrition. Typhoid fever is a germ disease located in the small intestines, infectious while not contagious. During the last few years an exclusive milk diet has been used by many physicians and in almost all hospitals, but the best authorities are now agreed that while milk should furnish the principal article of diet, other foods may be introduced, as junket, strained oatmeal and wheat gruels, chicken broth, soft cooked eggs, jellies, and during convalescence a little ice cream is allowed. Typhoid patients usually require frequent feedings, and there is always a craving for cold water which may be gratified, but it is always necessary to restrict the quantity at any one time. It is wise to give greatest amount of foods when temperature is lowest. During convalescence great care must be taken in resuming normal diet, and all solid food.

In the dietetic treatment of rheumatism physicians differ, but one point upon which they agree is, that a moderate diet of well cooked simple food must be enforced. This disease is characterized by an excess of uric acid in the blood, and while pain in the joints calls for external appliances, the acid state of the blood calls for special diet. Foods rich in extractives, as tea, coffee, alcohol, beef, sweetbreads, should be avoided by the sufferer from rheumatism. Cereals, milk, eggs, fresh fruit and vegetables (specially celery and white bread, which are popular English cures for rheumatism) should form the principal part of the diet. The best beverage is lemon juice, which may be pleasantly combined with water or other liquids.

Diabetes is essentially a dietetic disease. No drug or medicine remedy has yet been found to cure it, but by guarding the diet one can keep the disease under control. In arranging a diet for a patient with diabetes it is necessary to avoid carbohydrates or starches and sugars, as far as possible, and to increase the proteids and fats. The change in diet must be a gradual one, as too sudden a reduction of the carbohydrates might prove fatal. The

principles upon which this disease are to be treated, have been laid down as,—

(1) Reduce to a minimum or avoid altogether all substances containing starch or sugar.

(2) Give as much animal food as can be comfortably digested and assimilated.

(3) Replace the discarded carbohydrates by suitable substances and vegetable fats and oils.

(4) Except in the severe form, encourage muscular exercises to consume the excess of sugar in the blood.

The diet of a diabetic patient is very expensive, as so much proteid food is used. Forms of proteid which are advertised are meat, fish and eggs. Four to six eggs may be taken daily. Best fats are butter, cream, cheese, olive oil, fat bacon and oily fish. This may seem to be a very rich diet, but as there is little tendency to gastric disorders among diabetics, any of the above can be given without hesitation. All condiments are used in preparing menus for patients.

Bright's disease is often applied to all kidney troubles, but now more specifically applied to chronic forms of kidney trouble. The disease is recognized by an excessive formation of albumen. It is often brought on by over work and worry, or use of alcoholic liquors, or even diet containing too much meat extract, especially beef. A milk diet in extreme cases is considered usually a safe one to follow, and will do a great deal to heal the kidney cell. If a person is up and around, 3 to 4 quarts of milk daily with some rice or bread should be taken. Overloading digestive and eliminating organs should be avoided. In Bright's disease eggs are never allowed, but cereals and milk are used freely. If meat is given at all, allow only white meat of chicken. Tea and coffee are forbidden on account of their action on the heart.

Perhaps a few words regarding diet in consumption (phthisis) may not be out of place, although the disease has been carefully discussed in a former number of the Women's Institute report. On account of the great destruction of tissues in the consumptive there should be a generous supply of tissue-forming foods. There should also be plenty of food that is easily digested. Hygienic surroundings and an ample supply of fresh air are necessary, as well as a special diet. In this disease appetite is most capricious and easily lost, so that it must be tempted by good cooking and appetitizing dishes well served and agreeably varied, while still bearing in mind that they must be easily digested foods. The diet advised by many physicians contains fats of all kinds, as cream, butter, olive oil, bacon, etc. Eggs in all forms are allowed, and meat, especially beef, due to the fact that patients tire of it less quickly. In fact there are few foods which need be excluded in feeding the consumptive patient.

Indigestion is another disease very prevalent, and as it varies with the individual constitution no special diet can be recommended, but a few rules regarding diet may be helpful.

(1) Eat slowly and masticate thoroughly.

(2) Eat at regular hours.

(3) Avoid too much variety at one meal.

(4) Take fluid an hour before each meal, or two or three hours after meal.

(5) Do not eat when greatly fatigued.

(6) Avoid taking business worries to the table.

(7) Take systematic exercise in open air.

(8) Cold sponge and massage of body is good.

In all cases of indigestion the guiding principle is, to supply sufficient nutriment, but with care to give the enfeebled organ as little to do as possible.

There are many other diseases which might be mentioned, such as measles, mumps, whooping cough, etc., but as the diet in these are guided by the severeness of the attack, personal likes and dislikes of patient, it is thought wise to leave them untouched.

It is the earnest hope of the writer that this paper will furnish some suggestions and stimulus to the Women's Institutes of Ontario. If any readers care for detailed information concerning topics treated herein, they are advised to consult the standard works of some well known authors. It is believed, however, that a popular treatment of these topics will prove useful to the home-makers of our young and growing country.

The importance of well ordered housekeeping, good cereals and good health, cannot be over-estimated. In proportion as the women of our country become more intelligent concerning the use of foods and household economy, to the same degree will the community and nation be benefited.

The days of guess work and rule of thumb are passing away in the callings of women as well as of men, and the world now requires more skilled and competent workers in the home. The old adage "that an ounce of prevention is worth a pound of cure" was never more applicable than to dietetics in health and disease.

MEATS—THEIR SELECTION AND PREPARATION.

By Miss N. L. Pattinson, Bowmanville, Ont.

Probably no part of the daily expenditure for food requires as much careful consideration as is needed in the purchase of meats, for meat is the most expensive of food materials, and the difference in prices is not by any means a guide as to the difference in food value obtainable.

In order that the purchaser may buy intelligently, it would be well if each one would make a careful study of a well-prepared meat chart, showing the different cuts of meat, or, better still, visit the butcher's shop and watch the cutting up of an animal ready for the market.

The tender cuts of meat are taken from those parts of the animal where the muscles are least used; the muscles are soft because they have not been exercised; on the other hand, those parts much used produce the tougher cuts, which are cheaper on account of their coarser texture. The tough meat forms more than half the weight. The tenderloin, situated immediately underneath the backbone and protected on the other side by the kidney fat, is tender by virtue of its position. The shoulder and leg, carrying the weight of the animal, are developed, forming the stronger muscle and consequently the tougher meat.

With this development and toughening of the muscles there is also an increase in the food value: the muscle fibres in each are the same; the difference is in the connective tissue binding these fibres together. The tougher cuts, if carefully cooked, will be found also to have the better flavor.

While in many cases the most tender cuts are preferable, yet often the cheaper parts may be used to better advantage, especially when we remember that from the less expensive pieces the greater food value is obtainable

In either case, careful cooking is necessary. The method to be used is to be decided by the cut, whether tough or tender: tender cuts may be

cooked in so-called dry heat—roasting, broiling; the tougher ones must be either chopped before they are cooked, or cooked in a moist heat.

The aim in the cooking must be to soften the muscle fibres and connective tissue, to keep them softened throughout the cooking, and at the same time to prevent the escape of the juices and flavoring extracts. A very high temperature during the cooking will not do this, but will harden the muscle, making the meat dry and tough. The meat should first be seared over a strong heat to form a coating on the outside, which seals the cells and keeps in the juices; then the temperature should be reduced and the cooking continued with less heat in order not to harden the muscle throughout. This coating of the albumen being formed, it should not be pierced, as then the juice has a means of escape. It is impossible to make a rich broth and have a juicy, highly flavored piece of meat at the same time. These points hold true in any case where the meat alone is to be used, whether tough or tender.

In cooking a tough piece, plunge the cut into a generous supply of boiling water, and keep the water at the boiling point for ten minutes in order to coagulate the albumen and seal the pores of the meat; the coating thus formed will prevent the solvent action of the water and the escape of the juices. But if the boiling be continued, the whole interior of the meat would in time be brought near the temperature of boiling water, with the result that the meat would be hardened throughout. Therefore, instead of keeping the water at the boiling point, the temperature should be allowed to fall to about 180 deg. F. (simmering point); a long, slow cooking in this way will leave the meat tender and juicy, instead of tough and dry, as will be the case when the water is kept boiling.

If, on the other hand, the juice is to be extracted as in making broths, soups, etc., the meat should be cut up, to expose the larger surface, then put into cold water and brought slowly to the simmering point, at which temperature it should remain until the juice has been drawn out.

These points with regard to the temperature in special cases may be followed in whatever method is to be used, whether boiling, roasting, or cooking in water.

Besides being able to recognize the different cuts of meat, and to know their relative values, it is well also to have some means of judging as to the quality of meat in general. It should be fairly fat, with streaks of fat throughout the muscle fibre; the fat on the outside of the cut should be of a creamy color—if too pale it indicates an old animal. The flesh should be firm; it should appear moist, but should have no drops of water exuding. Note also the characteristic odor.

Care in the selection and preparation of this important part of the household needs should result in satisfaction, both as to the lessening of the amount of what is often a large daily expenditure, and also the palatability of the meat purchased.

USE AND MISUSE OF BEVERAGES.

By Miss Mary Bell, St. George, Ont.

This is not to be a paper on temperance, although the subject may suggest it. There is no space for such a large subject except as it comes under the injunction to be temperate in all things. Temperance, as the term is usually interpreted, refers to intoxicating drinks, and of course the majority do not indulge freely in such; but stop and think how intemperate a great many people are in their eating and drinking.

Water. Perhaps water is most universally used for drinking purposes, as it is Nature's beverage. What use is it in the system? About two-thirds of the total weight of the body is made up of water—that is, if a person weighs 120 pounds, of this weight there will be 80 pounds of water stored in the tissues. The importance of water as a tissue-builder and its right to rank as a true food are at once apparent from this statement.

Recent experiments have brought out the fact that the water of the tissues and that of the blood are interchangeable. If the blood becomes too thick or concentrated, water passes out of the tissues to make good the deficiency; consequently the tissues become drier and more shrivelled, as in the case of fevers. Then again, if the blood be habitually overloaded with water, some of the surplus passes out into the tissues and they become abnormally watery and bloated. The tissues then, in a sense, might be called reservoirs of water, and just as they are filled or empty does the weight of the body vary to a large extent.

Amount of water to drink. In health one should be temperate in the drinking of water. What is being temperate? There is no doubt that more people drink too little water rather than too much. It is reckoned that a good beverage is three pints daily. About four and a half pints are given off from the body every day in various excretions, so this amount must be replaced in some way—partly by the food, and partly by drinking water. The exact amount of water must vary with circumstances, and especially with the amount of perspiration produced. If a person perspires freely, from three to four pints should be taken daily.

Influence of water on digestion. The first point to be noticed is that water is not absorbed into the system through the stomach. When water enters the stomach it begins to flow into the intestine almost at once. It does not flow steadily, but in little gushes, until all has escaped. It is estimated that it takes about three-quarters of an hour for a pint of water to be emptied out of the stomach into the intestine. Hot water will escape in even a shorter time than cold water—the heat seems to increase the movement of the walls of the stomach. It is a splendid thing to drink hot water in the morning before eating anything. It has been seen how it will wash out the stomach, so it will be kept sweet and clean. Water will also help to keep the system in good order. It helps to keep the food in motion, assists in dissolving the food, and also washes out all the digestive organs so no waste matter lingers in them.

Water source of disease. The rapidity with which water passes through the stomach causes it to be a dangerous source of disease. There is not time for the gastric juice of the stomach to kill any germs which may be contained in the water. If there is any suspicion that drinking water is tainted, insist on having it purified. This may be easily done by boiling, and the flat taste can be overcome by shaking the boiled water in a bottle or jar until the air becomes mixed with it again.

Summer drinks. Under this head comes orangeade, ginger beer, and all the long list of soft drinks to be obtained. Some of these, if properly prepared, are very good and have some nutritive value. For instance, they contain enough sugar to yield a deal of energy to the body. Their refreshing influence also is partly due to the large amount of sugar used in their composition. It has been proven by experiment that the eating of sugar in some form will rest and refresh a person very quickly. It is so easily digested and readily absorbed, that it nourishes the tissues in a short time, and thus sugar acts as a stimulant.

Manufactured drinks. The danger, however, in using these manufactured drinks lies in the manner in which they are prepared. They are usually composed of water sweetened with cane sugar, mixed with an acid, flavored in any way desired, and finally charged with carbonic acid gas. Unless the fruit is sold as a genuine fruit product, and guaranteed to be such, the acid used is most often a mineral acid such as acetic or phosphoric, instead of the natural citric acid of the fruit. This latter acid is very beneficial and cooling in the system, but the mineral acids have not this effect.

The following recipes for making these drinks are taken from the "Mineral Water Makers' Annual."

Lemonade.—8 lbs. sugar to 1 gal. water; lemon tincture, 4 oz.; acetic acid, 4 to 5 oz.; charge with carbonic acid gas.

Ginger Beer.—8 lbs. sugar to 1 gal. water; oil of lemon, acetic acid, 4 oz.; tincture of ginger; charge with carbonic acid gas.

These two will show that soft drinks have very little to do with the fruit and substances from which they derive their names. They are very rapidly being given the same dope—a fitting term, indeed—and yet children are allowed an unlimited quantity of them.

Home-made drinks. As these summer drinks are usually made at home out of good materials, such as oranges, lemons, berries, etc., they are all right, and, as we have seen, they have the same nutritive value and cooling properties. The manufactured ones, however, may be the source of a great deal of harm.

Tea. Tea was originally obtained in 1610 from the leaves of the evergreen shrub Thea. There are four gatherings annually—the first being considered the best, as first quality tea is made from the young, whole leaves.

Black and green tea. The treatment of the leaves after they are picked varies according as black or green tea is to be produced. For black tea the leaves are withered in the sun, then rolled until they are soft and broken. They are then made into little balls, and allowed to ferment. While fermentation is taking place, some of the tannic acid in the leaves is changed into an insoluble form, so we see that black tea contains less tannin than green tea. Green tea is not allowed to ferment before the final drying. In the olden days, green tea used to be colored with prussian blue, or dried on copper kettles, but this has been done away with. The chief difference now is in the fermentation, which renders the tannin insoluble.

Preparation of tea. Tea should never be boiled, but always made as an infusion. Pour boiling water over the tea, let it stand for four or five minutes—never longer—far too much tannic acid will be extracted and a bitter flavor will be developed. The practice of allowing tea to boil, or of using leaves twice with a small additional supply for a second pot, cannot be too strongly condemned. After the tea has stood from four to five minutes the liquid should be poured off the leaves into a hot tea-pot, so no more tannin will be extracted. It can then be kept hot for any length of time. Freshly made tea, prepared with freshly boiled water, is the best, however, as prolonged boiling or heating of water makes it flat by driving off the air.

Influence of tea on the system. Tea-drinkers seem to require less food than those not addicted to its use, as it has been proven that there is less wear to the tissues when it is frequently taken. It would seem from this statement that tea has a food value. It is simply a stimulant, however, to the nervous system; sooner or later the evil effects are shown and the system becomes undermined and offers little resistance to disease. Excessive tea-drinkers are apt to become nervous, and have to resort to the use of more

powerful stimulants. Tea taken in moderate quantities is not harmful—where the mistake is made is by taking either too much or by drinking tea which has not been properly prepared. It is said that Canadian women are becoming a nervous race. Can this be guarded against in this one respect at least?

Coffee. Coffee, like tea, has to be cured by heat. It is obtained as a berry, which has to be roasted to produce either odor or flavor. Chicory is often added to coffee because it is cheap, but the flavor is objectionable. The best coffee is that which is finely ground—sometimes pulverized—so that it may be prepared as tea. It is not necessary to boil coffee, as is so generally supposed, if this fine coffee is used. Pour the boiling water over the coffee, or through it by using a coffee percolator, and proceed in the same manner as preparing tea. In any case, only allow the coffee to come to the boiling point, and a more delicate flavor will be produced.

Effect on system. Coffee affects the nervous system much the same as tea—the stimulant being caffeine. It is often said that a cup of strong coffee will relieve headache. This is simply due to the large amount of caffeine extracted in the preparation, and the nerves are over-stimulated to renewed action. Later on a feeling of lassitude will be felt, as coffee is a heart depressant as well as a nerve tonic. When first taken the heart beats more forcibly and rapidly, but this is soon changed and a heavy, stupid feeling is the result.

Discovery of coffee. There is a tradition among the ancients concerning the discovery of coffee, to the effect that a poor shepherd observed a strong hilarity amongst his sheep, and on watching them noticed that it was always produced after eating the berry of a certain tree. Upon eating it himself his neighbors said that he had been indulging in the forbidden wine. He revealed to them his discovery and they at once agreed that Allah had sent the coffee-plant to the faithful as a substitute for wine.

Cocoa. It is interesting to note that cocoa was first taken to European countries from America. Columbus carried it from Mexico in 1520, even earlier than tea or coffee were introduced into Europe. Cocoa is prepared from the seeds of a fruit which resembles a cucumber in appearance. These seeds, like black tea, are allowed to ferment, and then are roasted. This produces a dark color and takes away the bitter taste of the seeds. They are then passed through hot rollers, which melts the seeds, and part of the fat is removed from the liquid. The chief difference between the chocolate and cocoa is that the fat is not removed from chocolate.

Place of cocoa in diet. Theoretically, cocoa is a valuable food on account of containing a large amount of fat, but this does not hold true in practice, unless it is prepared with another food, milk instead of water. There is such a small amount of cocoa consumed that its place in the diet is not really very different from tea or coffee. It differs from these latter, however, in that its action on the nervous system is so slight it can practically be left out of account.

Cocoa-Kola. There is a preparation of cocoa, called cocoa-kola, which is worthy of some consideration. As the name implies, it is prepared chiefly from these two ingredients, cocoa and kola. Kola contains a large amount of caffeine, which has been mentioned under coffee as being a powerful stimulant. Cocoa-kola, on account of this stimulant, can be advertised as possessing remarkable sustaining qualities, banishing fatigue and refreshing wonderfully. However, it is like other beverages of this character, its free and continued use cannot be recommended.

Milk. This beverage has been considered from many standpoints in former reports, not only as a drink and food for infants, but the scientific care of it. It shall not be treated in this article.

Beverages for the sick. There is only space enough to touch on those beverages or foods used in a liquid diet in cases of disease. They are beef-tea, beef-juice, broths, egg-nogs, albumen water and many others too numerous to mention. Their food value can be seen at once. They are all tissue-builders or proteids, exactly what is needed when the tissues are worn out by disease. The subject is too extensive for this article, but it is a very interesting study, and needs to be taken up by our women—the dietetic value of these beverages and their proper preparation. A great deal is written about the care of the sick-room, but until the necessity for these liquid foods is thrust into the home, how the knowledge of them and the methods of preparing them are neglected! May not this be a plea for their consideration in our Women's Institutes?

CANNING FRUITS AND VEGETABLES.

By Mrs. Colin Campbell, Windsor, Ont.

Canning is an improvement upon the old-fashioned way of preserving pound for pound in sugar. It retains more of the fresh and natural flavor, is far less troublesome, and more economical. Choose only perfectly sound and fresh fruits. If you have your fruit to buy, it is false economy to purchase fruits on the verge of decay, even at very reduced rates, as they quickly ferment after canning, and you not only lose your fruit, sugar and labor, but very often the jars as well. Before commencing work have all the requisite utensils and vessels perfectly clean, and at hand. The things which will be needed are scales, jars enough to hold the quantity of fruit you plan to preserve, a strainer, skimmer, silver spoon, perforated wooden spoon, large saucepan, a jelly bag, pint and measuring cups, funnel for fruit, tray, dish-pan, towels, holders, and plenty of hot water.

If the family is small, select pint jars, which allow a can of fruit to be used up before one tires of it. If there be six or eight to be catered to, a quart-jar is none too large. When purchasing new jars look them over carefully to see that there are no defects and that the covers fit perfectly. Discard all hard or cracked rubbers and use only those which fit the jars snugly. At 10 cents a dozen for rings you have a cheap insurance on the keeping qualities of canned or preserved fruit. Pour water into each jar, seal and invert; if it leaks ever so slightly do not use it. When you have picked out perfect jars, wash individually inside with a bottle brush and hot water in which a small quantity of washing soda has been dissolved, then sterilize by setting in cold water, letting it come to the boiling point, and boil for a few minutes. Fit each jar to a ring, cover and leave in the hot water.

If much fruit has to be put up, it is better to do all this preparatory work the night before, leaving the morning free for picking over the fruit and cooking. When the fruit is ready to be canned remove a jar from the boiling water in which it has stood, and set it in a soup plate, wrapped in a towel wrung from hot water. Into the jar drop a silver spoon. Silver being a good conductor of heat, absorbs the heat from the fruit and lessens any danger of the jars breaking. Dip the rubber in boiling water and put it on firmly. Set a fruit funnel in a jar and gently fill in the fruit, moving the

handle of the spoon gently about to allow air bubbles to escape. Fill the jars, lift out the spoon, then add syrup until jar overflows, put on the cover and screw it as tight as possible. Turn the jars on their side and turn them occasionally as the fruit is cooling in the jars, this will prevent the fruit rising to the top of the jar when cold. When cold wrap in thick paper, to prveent the light bleaching the fruit, and set away in a dark place.

The work should be done in a well swept and dusted room, and the clothing of the workers and the towels used should be clean. The fruit used should be sound and clean.

Choose the early cool morning for putting up the fruit ripened under a July sun, and if your berries are to be picked instead of from the market, gather them the night before. Fruit, which has been gathered on a rainy day or when the dew is on it, will not keep well.

Select fruit which is under-ripe rather than when ready to drop with luscious ripeness. It will make a much better preserve and keep more readily.

If fruit is very juicy, avoid adding water to it when canning. The less water that has to be used, the finer the flavor of the preserve, and the more beautiful its color. Never touch cooking fruit with a spoon or fork which is of any material except silver, wood, or granite. A tin spoon may ruin the color and flavor of a whole kettle of fruit. Try a little of your sugar to make a syrup before commencing the canning process. If a bluish-gray scum gathers on the top after the boiling send the sugar back to the grocery man with an order for a better quality.

Preserving.—There are four common methods of preserving fruit:—Cooking the fruit in the jars in the oven, cooking the fruit in the jars in boiling water, cooking fruit in a syrup and stewing it.

The first two methods are very useful for juicy fruits, such as berries and cherries that require no water. Prepare the jars and fruit as for ordinary canning. Fill the jars with the raw fruit as for ordinary canning, using a cup of sugar to a quart jar of fruit, sprinkle the sugar through the fruit, seal the jars and place them either in the oven or in hot water on the top of the stove. When the fruit is cooked in the last named way screw lids on loosely, stand jars in boiler well protected at the bottom, either by a board or several thicknesses of cloth, fill the boiler with water to within one-half inch of top of jars, heat gently to boiling point, boil until tender. Allow jars to cool slightly, then remove. The jars will have to be filled one from the other and resealed.

Fruits may be done by this method:—Carefully select fruit, fill in thoroughly sterilized jars, make a syrup, fill the jars with it, cook as above. It is thought by many that fruit cooked in this way retains its shape, color and flavor better than when cooked in the preserving kettle.

The process of making syrup is as follows:—Put the sugar and water into a sauce-pan and stir on the stove until all the sugar is dissolved, heat slowly to the boiling point, and boil gently without stirring. The length of time that the syrup should boil depends on the richness desired. For preserving use $\frac{3}{4}$ lbs. of sugar to one pound of fruit. For making jam use 1 lb. sugar to 1 lb. fruit; for jelly use 1 lb. sugar to a pint of fruit juice, and for canning use $\frac{1}{2}$ lb. sugar to 1lb. fruit.

When canning the fleshy varieties of fruits such as peaches, pears, plums and apricots, the steamer ought to be called into use. If heated to steaming instead of being cooked in boiling syrup, the fruit may be kept whole and look nice, as well as keep much of its flavor. Peaches, plums and apricots need only a few minutes of steam bath. Pears of the hard variety

ought to stay in long enough to be easily pricked with a straw. While paring peaches, and pears for canning lay each piece in cold water, to which the juice of one lemon has been added, until ready for use. If this is not done the fruit will discolor. For the same reason use nothing but a silver knife to cut and pare the fruit. Do not allow the fruit to stay in the water, however, any longer than is necessary, as the juices will be lost.

Small pears or peaches which are not good enough to can may be made into excellent sweet pickle; the spices provide what flavor the fruit lacks. The recipe for any kind of sweet pickle is seven pounds of fruit, 1 pint of vinegar and 3½ pounds of brown sugar. Let the spices accord with your own taste. Do not use the same ingredients throughout in putting up fruit which requires a touch of some flavor more than its own. Pears for instance makes a flat tasting preserve without some other flavor. In one jar make this flavor ginger, in another lemon peel, put orange-peel in another, and a mere suggestion of mixed spice in the fourth.

In canning crab-apples leave on the stems, and cook gently in the syrup to prevent breaking. Preserved whole in a clear red jelly, crab-apples are a most sightly and excellent preserve, as well as one of the cheapest.

Jelly-Making. The secret of successful jelly-making lies in the careful observation of a few simple directions, which must be followed exactly or the jelly will be cloudy, ropy and thin. In the first place use only perfect fruit, see that the fruit is clean, free from all stems, but do not remove the skin. Use fine granulated sugar. Over-ripe fruit and a cheap grade of sugar will never make good jelly. Use porcelain-lined or graniteware kettles and dishes, as much as possible in making jelly. Put the fruit in the preserving kettle with just enough water to prevent burning; heat slowly in a covered kettle, and cook the fruit thoroughly but not until it is broken up. Strain juice through two ply of cheese-cloth, but do not use pressure. Measure the juice and put it in a clean preserving kettle. For every pint of juice add a pint of granulated sugar, stir until sugar is dissolved, then place over the fire, watch closely, and when it boils up, draw it back and skim; put over the fire again and boil and skim for three times, then pour into hot glasses taken from a pan of hot water on the stove. To test jelly, drop a few drops on a dry cold dish. If you can raise the edge clear from the dish, begin to fill vessels at once. If the liquid sticks or spreads freely, boil for a moment or two longer. Good, strong kitchen tumblers costing 2 or 3 cents apiece, make satisfactory jelly glasses. Tin covered tumblers have proved troublesome as the tops corrode, are hard to remove from the glass, and often the jelly has moulded underneath the tin. Where jelly is to be packed and sent a distance, tin covers are desirable, otherwise a paper cover is better. Have discs of thick, white paper the size of the top of the glass, dip a disc of paper in spirits and put it on the jelly. Cut discs of paper half an inch in diameter larger than the top of the glass. Beat together the white of an egg, and a teaspoonful of cold water, wet the paper covers with this mixture and put over glass.

If any one fails in making grape, raspberry, blackberry, or plum jelly let the experiment be tried of melting the thin jelly and adding one or more pints of apple juice, according to the amount of jelly—perhaps 1 pint to six tumblers. Let the mixture boil, try a teaspoonful in a saucer, pour it into glasses, and a thick, firm jelly will result without a change in flavor, or any evidence of apple juice.

Canning Corn. Gather while tender, husk, cut off one-half the depth of the kernel and scrape out the rest. Fill the jars as prepared for fruit,

packing the corn down very solid in the jar with a potato masher. If the corn is juicy, as it should be, there will be no need of adding water, but if there are cavities where the corn is not pressed together put in cold water enough to fill them. Put the cover on, not screwing tight, and place the jars in a boiler of cold water, having placed in the bottom a board or a few corn stalks with husks on top of them to stand the jars on. The water which should not come to the top of the jars, should be brought to a boil, and then boiled without ceasing for 3½ or 4 hours. When done the cans should be lifted out, one at a time from the boiling water, and immediately sealed. The rubber ring must always be put on the jar before it is set to boil, and the lid must be screwed down after cooking without being removed from the jar. The rubber and top of jar must be free from particles of corn before boiling. The water must be kept boiling until the last can of corn is removed from it. As soon as screwed up, stand the jar upside down and leave it thus until cold. If the jar leaks when turned over, screw tighter, but if this does not stop the leak, do not try to keep that jar. When quite cold turn the jar over, wash off and put away in a cool, dry, dark place.

Rules to Remember. Do not wet the corn, nor use it when wet from rain or dew, pack solid, use new rubbers only. See that rubber and top are free from particles of corn, boil for 3½ or 4 hours. Never remove cover after boiling. Screw down tightly, turn bottom up and leave until cool; never lift can by the top after sealed; put away in a cool, dark place; never put any seasoning in corn when canning. The results of this process have been excellent.

Canning Peas. Gather the peas when not too hard, put in jar, fill jar with cold water, screw top on tight and boil the same length of time as corn.

Canned Tomatoes. Tomatoes are gathered when ripe, peeled, and all green portions taken off; placed in jars and boiled three hours.

MISTAKEN KINDNESSES.

By Miss Annie Rose, Guelph.

The most casual observer cannot help but notice the difference between the children of to-day and those of twenty-five or more years ago. The sweet timid child of ten or fifteen years ago is almost unknown and instead we have the nervous, excitable, conscious youth. Why is this? What has brought it about, and what is the remedy?

We think the change is due largely to the changed conditions. Since the introduction and almost universal use of the telegraph, telephone, bicycle, steam car, electric car, steamboat and automobile—time and space annihilating machines—the child sees, hears and goes more in a few years than his parents did in almost a lifetime. He learns too much and passes from one thing or occupation to another too quickly. He does not develop strength of will and he lacks the "gift of continuance." Off with the old, on with the new, in everything—games, toys, clothes, even friendships.

When those of us who are grown-up were young we were treated as children, we went to bed with the birds and flowers, were simply but comfortably clad, and lived on plain, wholesome, nourishing food. How is it now? In far too many homes the children are allowed to sit up too late. The evening concert, or the privilege to remain up because there is company should be the rare exception. All growing children should be in bed by

eight o'clock, and earlier if there is any inherent weakness. It is there they recuperate after the activities of the day.

Then as regards clothing, one has only to look to see how simply hideous is the children's dress of the present day. Poor silk, satin or velvet trimmed with cheap lace, perishable chiffon or muslin hats with gaudy flowers or straggling feathers. Perhaps I am too Puritan, but to my mind young children should only be dressed in washable goods; lawns, prints and muslins for warm weather, and soft woollen materials for cold, never sacrificing health and comfort for appearances. A milliner told me it grieved her to see the little tots of six or eight years picking out their own hats. They really must have this or that to wear. So and so had one, and they want one like hers. It was not a question of suitability, or if father could afford it. Invariably the mother gave in to the childish fancy.

I know one lady (I'm glad to say she is the President of a flourishing Women's Institute) who keeps three maids and she said her four children had never worn anything but washable clothes. How sensible, how sweet and clean the children could always be. Children must play, it is their nature, and they should not be handicapped by too fussy perishable clothes.

Lastly—the food. Why have children indigestion? "Either this child sinned or his parent" may well be said of the child with this complaint. This same lady who was so careful of her children's clothes was equally careful of their food, and although the children sat at the table with the grown-ups, a dessert prepared with milk, easy to digest and nourishing, was always provided for the children. The child of to-day is consulted as to what he will eat. The hopeful young son of a College Professor was asked if he would have some meat—"Yes, but I don't want any skin or fat" was the insolent reply. The better plan is to serve the child and begin from the first to do so. Give him what is best for his health, and expect him to eat what is put before him.

Indigestion often comes from nervousness or overtiredness. If the child has been duly excited or allowed to sit up late, the chances are that his stomach will be upset.

From tea time to bed time should be the quiet period of the day. Often the father, who has been absent all day, wishes to be kind to the children and relieve the mother for a while, so he romps and plays with the children who soon become heated and excited, and when put to bed cannot sleep. The parents wonder why, for surely the little ones are tired. Have we grown-ups never suffered from sleeplessness brought about by excitement? One lady who was nursing her first child, said to the father—"Now George, don't make her laugh, it is so near her bedtime." This wise young mother did not permit her baby to be excited or played with after the evening meal. What different treatment another child received, whose father gave him a good time (?) after tea each day, and as a result he is a restless, nervous boy, who cannot sit still two minutes. I would like to emphasize this point, as parents err from a desire to be kind. The nerves of sight, hearing, feeling, etc., are very sensitive in the infant, and cannot endure sudden shock without injury.

Be firm with the child, and at the same time be kind. Firmness with kindness is the foundation of child culture. Say "no" and mean it and stick to it; do not be coaxed or tormented into saying "Yes," and above all, for the sake of everybody in the house, do not allow the child to tease or argue. Do not make impossible threats such as "If you do not keep quiet I will give you to that big black dog outside." A lie, as well as an improbability. And do not give promises that you do not intend to fulfil.

Indulgence is not kindness and is sure to sow seeds of discontent, whose harvest will be disappointment and heartaches. I pity the only child, as it cannot help but run great chances of being made selfish through indulgence. It is usually the children of large families, who grow up kind, obliging and self-reliant.

Children should be obliged to do little acts of kindness, and easy chores about the house without being paid for them. At the same time I think it is a good plan to assign some task, such as bringing the cows, helping with milking, getting the kindling, etc., and a fixed recompense of so much a week allowed, providing the task is faithfully performed.

If we can impress the child with the value of time and money, and the relative value of these compared with character and usefulness we are laying the foundation for noble men and women.

HINTS ON CLEANING HOUSEHOLD UTENSILS.

Compiled from Several Papers.

The care of metals is no small part of our household care, as we all like to have our silver, brass, copper, nickel and tinware spotlessly clean. The causes of tarnish on metals is due to a special deposit from oxidation caused by moisture of the air, to the presence of gas, and the direct action of some acid or corroding substance.

Kitchen utensils in general must be kept thoroughly clean, as upon their cleanliness depends much of the success of cooking. They retain odors and flavors if not cleaned properly. Avoid scorching a dish, as a chipped dish or scorched spot will scorch very quickly again. Never leave dishes standing about with food on them. Remove the food and soak. If the dish is scorched, do not scrape the part, but put it on to boil with soda and water.

Silver should be washed each time it is used in hot soapy water, rinsed well in hot water and dried with a soft towel. If stained with certain foods and acids, it then requires special care. In polishing silver, it is best not to use ammonia or vinegar, as they injure the silver, and for that reason we should be careful about buying prepared mixtures. They may do the work quickly but are often injurious. It is less expensive to use whitening moistened with alcohol. Sift the whitening through the sifter to remove hard lumps that might scratch the silver, moisten with alcohol and apply with a soft cloth; leave on until dry, then rub off and polish silver with chamois. Always use friction to clean it thoroughly. When putting silver away, wrap each piece separately. Blue tissue paper is best. Never wrap silver in any material that is white, as the sulphur used in bleaching will cause tarnish on the silver. Never leave rubber near silver, as it will discolor the metal.

Copper and Brass can be quickly cleaned by using an acid, but this destroys the lustre, and, if the metal is not much tarnished, it is best to not use an acid, such as lemon juice or oxalic acid. Rottenstone and sweet oil have been found excellent for cleaning these metals. It may take longer, but one is repaid by the soft yellow finish obtained. The rottenstone can be purchased in a powder. For ordinary purposes, use kerosene. If brass is much tarnished, mix common salt and oxalic acid or vinegar, apply with a cloth and rub briskly; wash well and rub dry. It can then be polished with rottenstone and oil, or with putty paste which is one of the best manufactured pastes. Tarnish caused by acids may be removed by acids, but the utensil will tarnish readily again unless carefully washed.

Nickel will not oxidize, and is a most desirable metal. It simply requires to be washed in soapy water and thoroughly dried. It may be polished with whitening and alcohol.

Aluminum may be treated in the same manner as nickel.

Tin. Do not scrape, but allow it to soak. If discolored, use baking soda or washing soda and water.

Knives. Do not immerse the handles in hot water. Clean ivory handles with whitening and lemon juice, or whitening and turpentine.

Glass. Use hot soapy water for greasy deposits, then rinse in clear hot water. Polish with a soft cloth or tissue paper. Clear cold water and a soft towel give a better polish. Use a brush for cut glass, and dry in sawdust free from resin.

Zinc. Use either kerosene and water, salt and water solution, or vinegar and water, and rinse thoroughly with clean water.

Iron utensils are not as much used now in our kitchens as formerly, but it is well to know how to care for them. To clean iron when new, cover with melted tallow or grease, let stand two or three days and then heat gradually until the fat melts; wash in a solution of hot water and soda, rinse and dry thoroughly. It may be necessary to repeat this process two or three times. In the daily care, soak the vessel as soon as it has been used, remove fat with soft paper and wash both inside and outside with hot soapy water. Iron rust is caused by the action of the oxygen of the air in the presence of moisture. To prevent this, cover iron that is not in use with vaseline or lard. To clean rust, rub with fat, sprinkle with lime and let stand over night; wash with soda solution. Powdered emery and oil is also good for cleaning rusted iron.

Marble. Wash with fine sandstone or powdered pumice stone, or cover with a paste of baking soda and whiting and polish with a piece of felt.

An iron *sink* lined with porcelain is the best. It should have open plumbing; that is, the pipes should be exposed to view. There should be an S shaped trap in the pipe. Hot, clean water should follow soiled water to clean the pipes. Follow greasy water with water containing an alkali. Flush weekly with a soda solution, followed by clear water. Allow water to go through a strainer, to prevent lint from dish clothes, etc., clogging the pipes.

Garbage Pails should be washed frequently with soap and boiling water, and dried in the sunlight. Sprinkle carbolic acid solution into the garbage barrel in summer time to prevent germ development.

The Refrigerator should be kept in a well-lighted and well-aired room. Never connect waste pipe with the drain pipe. Wash the shelves and racks weekly with hot soap suds, and rinse with clean hot water. Clean the grooves and corners with a wooden skewer. Clean the drain pipe with a flexible wire with a cloth attached, with hot soap suds and rinse with clean hot water. Thoroughly dry all parts.

Brooms. Soak below the stitching in hot water and ammonia, rinse and hang to dry before using.

Never wash the inside of tea and coffee pots with soap suds. If granite or agate ware is used and becomes badly discolored, fill the pot nearly full with cold water, add one tablespoonful borax, and heat gradually until the water reaches the boiling point; rinse with hot water, wipe and keep on the back of range until perfectly dry.

DUST AS RELATED TO FOOD.

(Copied from Bulletin 16, Reading Course for Farmers' Wives, by courtesy of Prof. L. H. Bailey, Cornell University, Ithaca, N.Y.)

Every garden has its weeds. Where the seeds all come from is a never-failing mystery to the gardener. These weeds are all large enough to be seen, and one can destroy them with the rake or the hoe. There are other weeds, however, that are nearly or quite invisible, and the gardens in which they grow may be the food on our tables. The germs from which these seeds arise may be floating in the air, so small that we cannot see them. They cling to the particles of dust, and when the dust falls they are planted.

By allowing the ordinary dust of an ordinary room to settle upon jelly contained in a box and baked for over one hour in a hot oven and then placing this box in a suitable temperature for the growth of bacteria, we will soon find that in about twenty-four hours, little specks will appear and these will rapidly or slowly grow larger and develop different colors.

Every housewife who has seen mold on her bread, her jelly, in her pickle jar, or possibly on shoes and books, will mistrust that the velvety, dark-centered spots are of similar nature. Molds spread their cells over the food supply, occasionally sending a few cells down into the substance, and others upward. From the tops of the upwright cells grow others and in or on them are formed the thousands of dust-like specks called spores. Each of these may start a new bed of mold.

The infinitely tiny spores falling upon some soft substance as cheese or bread will send their invisible lacy threads down into the substance, while on books, leather, wood, cloth, they may grow only over the surface and may remain visible.

Dust-gardens Everywhere.

We will now give our attention to the dining-room and the kitchen. The dust that is thrown into the air by a wrongly used, dry broom, or by a feather duster, will grow nearly as well in our milk, apple-sauce, on our jelly or bread as in this glass box. If, however, the dust is wiped off the floor, tables, chairs, etc., into a cloth where it is held until washed out, it will never reach the sauce and other foods. If the cloth be slightly damp or oiled, it will take and hold the dust much better.

There is another kind of plant which, especially in the country, is often present in house dust. This is yeast—also a single cell, but reproducing by little buds which swell out from the parent cell and may or may not break off later on. Those which float freely in the air, both inside and outside of the house, are called "wild yeasts." So far as shape, size and method of reproduction is concerned, they are little different from the cultivated yeast plants which are used to raise bread or to give the "sparkle" to sweet fermented liquids, as beer.

As the invisible yeast plants can remain alive for a long time without moisture, we may have them furnished to us in dried cakes as well as in the fresh compressed form.

To-day, even with the cultivated yeasts, the housewife who mixes her sponge in a dusty room, in dusty utensils, with old yeast,—or, with everything clean and fresh, if she lets the sponge rise too long or keeps it too hot,—is likely to have sour bread. The bacteria can grow well when and where the yeast cannot, so that acid will be made out of the alcohol which the yeast makes out of sugar. The yeast plants grow best at a medium temperature,

about 75° to 90° F., which is an average "summer heat." Above 90°F. they cannot grow so well, but the bacteria grow better.

The little yeast plant, although so small and simple in structure is endowed with many of the powers of the trees and vegetables or such higher plants. It requires food, has a certain range of temperature in which it grows best, will be injured or killed by too high or too low temperature, by too little moisture. If it be given the conditions which are favorable, it will feed, grow rapidly, and reproduce itself by swelling out one portion into a bud which may or may not break away from the mother cell. The most favorable temperature for the rapid growth of yeast plants, as already said, is from 75° F. to 90° F. Below this it will grow rapidly and therefore cannot do much work. At much above 90° it will be killed and dead plants cannot work any more than dead animals.

The work of the yeast plants is to change the sugar in the sponge into two substances—alcohol, and a gas which is called carbon dioxid. The millions of little bubbles cannot break through the sticky gluten of the flour, so they raise the whole mass. When the bread is baked the gas is dissipated, the gluten walls of these bubbles are hardened and the little holes remain, filled only with air. The alcohol, too, is driven out by the heat.

It is very difficult to keep weeds out of the vegetable garden because their seeds are carried to the soil in so many ways. When they have sprouted or grown a little, they may be pulled up easily. In the bread-garden we want only yeast to grow, but it is very difficult to have this, when neither the good plants nor the weeds ever become visible.

The chief enemies are the bacteria. They are in the dusty air of the kitchen, on the bread pan, the spoon, the cup, in the milk,—yes, and in the yeast, too, whether it is the dry or the compressed.

The wise housekeeper will be careful not to sow many bacteria in her yeast garden. She will scald the milk or boil the water, letting it become cool before she puts it with her yeast. She will have clean dishes in which to measure and to mix her bread. She will not sweep nor do any dirty, dusty work in the room just before she mixes it, because the bacteria will be raised into the air and then settle. She will carefully cover the dough while it is rising, to keep out the dust. With all her care there will always be some bacteria present, but these do not like the sugar solution very well and they want a higher heat than the yeast plants, but they do like the alcohol which the yeast makes, so that the dough should be kept at about summer heat only long enough for the yeast to make a sufficient amount of gas. If the dough becomes too hot so that the yeast cannot work well, or if it is allowed to stand too long, the bacteria will feed on the alcohol and turn it into an acid—the acid which is in vinegar. Then the housewife has sour bread.

There are poor kinds of yeast, and if a poor kind gets in it will make a bad tasting bread.

Do any of you still make the "salt rising" bread or "milk emptins," which years ago our grandmothers made? The "barm" made delicious bread, but "it never kept well." No, because it was then, and is now, made to rise by the wild yeasts, but the bacteria with the yeasts fell into it from the air, or perhaps were in the milk, and they soon made it sour or even putrid.

The yeast plants perhaps do more work which the housewife likes than ther molds or bacteria, but she must not suppose that these last are nemies only. She owes much to both of them, because their chief work in he world is to feed on and, by so doing, decompose or break up useless,

organic substances. Bacteria, especially, are scavengers, and molds soften hard parts and make the work of the bacteria easier and more thorough. When organisms work on material which we are glad to be rid of, we appreciate the result but do not give them the credit. But whether these extraneous organisms are directly injurious or not, many of them are no proper part of our food and should be looked on as a contamination.

Because they go on with their appointed work when and where we do not want them to, we think of them as only enemies. Bacteria do sour our milk, taint our meat, rot our potatoes and apples, while molds spoil our bread, our cheese, soften the cucumbers waiting to be pickled, and possibly spoil the best tablecloth laid in the dark, warm drawer; but we owe to bacteria our vinegar, our June-flavored butter, and the "retted" flax from which the table-cloth was made.

The Molds: Larger Forms of Plant Growth.

There are other invisible plants besides the bacteria and yeasts in the air. These are the molds, and they will get into the dough, also. If the bread be baked long and thoroughly, all these plants are killed, but if not, some will be left alive in the middle of a thick loaf and they may sour or mold the bread even then.

The writer once cut a new loaf of Graham bread bought from the baker and found a large spot of mold when she reached the center slice. She felt sure that the bakery or the dishes and meal were not clean. She knew that is was not sufficiently baked. The mold spores are so tiny and light that the air almost always has some of them in it.

No wonder the bread or cake left some time uncovered on the table becomes moldy when it is finally put into a dark box or jar! It will not mold if it is perfectly clean and dry: so that if we want to keep bread for crumbs, we dry it thoroughly in the oven or on the back of the stove. But while here it should be covered with at least one thickness of cloth to keep off the dust.

Molds will find moisture enough almost anywhere to help them start into growth. They and the wild yeasts are in numbers on the skins of fruit. If we put the apples, lemons, oranges, etc., in warm places, the mold plants will grow and soften the skins so that they are easily broken. Then the bacteria or more molds can reach the inside pulp and the fruit decays or rots.

The grapes on a bunch touch each other, so there is less air and more moisture between them in such places. Here the mold plants start first, and from one such place enough spores will be made to spoil a whole basketful of fruit in a short time. Lemons and oranges, as well as other fruits, may be kept for weeks, even in dogdays, if each is wrapped in paper and put in a cool place.

Apples or any other fruit may be preserved much longer if they do not touch each other. This is possible with small quantities. With large quantities in a mass there must be greater care to keep them from "sweating." They need to be kept as cold as possible and yet kept from freezing.

The woman who finds her cucumbers softening, either before or after they are in vinegar, may well think how she could have prevented the molds from settling there. Possibly, if she scalds the vinegar and pours it back over the pickles, she may kill the plants which are doing such work.

We cannot expect to be able to keep bread from molding in the jar or box which is not frequently scalded and sunned. The mold spores, ready for work, will lurk in the corners and the angles.

All food storage places should be kept as free from dust as possible, dry, cool, and supplied with fresh air, if we do not wish to lose the food by mold or decay.

If the drops of milk, gravy, molasses and other liquids, crumbs, of bread, bits of meat, grains of sugar, etc., are not wiped from the shelves and floors, bacteria and molds will soon be so plentiful in such rooms that no foods can be kept there long without souring, fermenting, molding, or becoming rancid.

One common place for the storage of food supplies is the house cellar. If the cellar were always light and dry, sunny and well aired, there would be much less danger from molding squashes, rotten potatoes, turnips, cabbages, apples, onions or other vegetables and fruits; but too often this hole in the ground has only an earth floor with boards put down to walk on, possibly no windows, or a small one closed in winter by the "banking" outside. Never a ray of sunshine to kill the bacteria and molds—fortunately the wild beasts do not like such dismal quarters! The decaying vegetables in these cellars are thus constantly "weaving shrouds for the upper chambers." The farmer has these vegetables in such quantities that he does not always feel his loss of food supply, but this is joined with dangerous conditions for the health of himself and family. Sometimes the conditions are so bad that from the open cellar door there always comes the smell of rotting potatoes, squashes or carrots. This, then, is not only wasteful, but criminally careless of human lives and health. We ought either to keep such supplies away from our house cellars or keep the cellars in such condition that these dust plants cannot thrive. They love darkness, and their deeds are always evil under such conditions. Some of the foreign cheeses which "smell to Heaven" are really made to putrefy in similar damp, dark, mold-infested caves.

Suggestions as to Cleanliness and Germ-prevention.

All spores are so light that a slight wind will blow them about; but they are heavier than air. They will therefore settle, and in settling will be caught by any exposed surface. This shows us how foolish we are when we sweep the floor just before we take the bread or pies from the oven, the sauce from the kettle, or just before we lay the table for a meal. We cannot sweep a floor with a stiff, dry broom without stirring up some of these invisible kinds of molds and bacteria, and a number of them, few or many, will certainly be caught by the food. Some of them may be distinctly injurious to health. It is dust-plants in the air which seed plentifully our food supplies.

Of course the dishes and tables, the hands and all utensils have germs on them; and so, when canning we must be careful to have the work done in a room as dust-free air as possible; thoroughly to scald or boil the fruit, the jars and the covers; to keep the fingers from touching the inside of cover or edge of the jar's mouth. Even the sugar, if not cooked with the fruit, may carry the yeast cell, the mold spore or the bacterium which will later spoil the contents. That rhubarb and cranberries may be canned raw and not spoil is because they have so much acid that the dust-plants do not like them. If sugar is added, there comes danger. The yeast plants may then ferment the fruit to alcohol, and a bacterium be able to make the alcohol into vinegar.

Given food, moisture and warmth, these little plants multiply with almost infinite rapidity. If food is scarce, if drought or cold come, many of

them can accommodate themselves to the hard times by contracting their already minute bodies into still smaller space and thus they can survive for longer periods. Life is present, and as soon as fortune smiles on them in the shape of warmth, moisture and food, they return to their former condition, feed, grow and multiply as before. The active forms are often easily killed, while these resting-spores may resist even boiling or freezing. Thus nature, the kind mother, protects and preserves her children, for each has an important work to do in the world. These innumerable, invisible plants form her army of scavengers which feed upon animal and vegetable matter that is either dead or has lost its normal vigor and therefore tend to threaten the welfare of man.

We can, however, put obstacles in the way of nature's operations. When forewarned, it is, indeed, a careless housewife who will let the enemy gain the advantage. Knowledge is certainly power here. As the plants that work the most harm love darkness, we will flood the house with light; as they must have moisture in order to grow, we will keep everything dry, especially the corners, cupboards, closets, storerooms and boxes that are dark. As they grow best in a warm place, we will keep perishable material as cold as possible. If we let light into such places, they will not only be drier, but we can see their condition. The first point of inoculation may be a damp dishcloth, towel, floor-mop or other damp fabric put under the sink to be "out of sight," in the clothes hamper, or in the "cellarway." It may be a few drops of milk, a little gravy of sauce spilled on the stairs or on the cupboard shelf, and not soon wiped up. Dust is always present in the house; bacteria and molds are seldom absent from that dust. Bacteria with the greasy dampness, soon produce a sour or rancid dishcloth; mold and moisture produces the mildewed towel; the moldy shelf will soon fill the cupboards with odors. All such articles furnish food for these dust-plants.

II. THE CONTAMINATION OF MILK BY MEANS OF DUST.

Professor R. A. Pearson.

Modern sanitation tries to eliminate dust, and to remove lodging places for it. Dust-laden mouldings and draperies are being eliminated from houses. These ideas are now extending to the barns, and are beginning to revolutionize barn construction and barn management. The first attention should be given to the protection of milk. Dust is not only "dirt," but it also carries germs or bacteria; and all bacteria contaminate the milk and many of them may produce distinct disease or disorder in the milk user.

Very few and often no bacteria are found in the air over large bodies of water. There is very little or no dust in such places. After a prolonged fall of rain or snow which has caused dust to settle, the air is found to be almost or quite free from bacteria. In other words, bacteria are most abundant in the air when dust is present. It is probably, safe to say that every particle of dust which floats in the air is carrying a greater or less number of bacteria, just as a raft floating in the water may carry a greater or less number of men. Tyndall suggested this long ago, and the idea is called his "raft-theory."

As has been shown, there is less dust (and therefore fewer bacteria) over water surfaces than over land surfaces. There is little dust and few bacteria at very high altitudes. A French investigator found no bacteria in 100 liters of air at the top of Mount Blanc. But the examination of air in an observatory at that point showed a small number of bacteria.

There are fewer bacteria in country air than in city air. The reason for this is understood when we remember the enormous traffic and the continuous action taking place in the streets and elsewhere in the city. Dust is being stirred up all the time. Furthermore, city dust is likely to carry more objectionable kinds of bacteria than are carried by dust in the country.

There is more or less dust floating in the air of houses and stables, and this dust is constantly settling. When it falls into milk it carries bacteria with it. If the milk is warm, these bacteria increase very rapidly; if the milk is cold, they may develop slowly but will be ready for rapid growth as soon as the temperature is raised. The production and care of good milk depend very much on the care taken to prevent dust from getting into it, and the maintaining of a low temperature after it is drawn.

Last summer, Walter E. King, of the State Veterinary College, and myself, made a number of tests to determine the importance of different sources of milk contamination. In most of these tests, a definite quantity of sterilized milk at 98° F. was exposed to some one kind of contamination that we wished to test. The milk was then examined, and in that way we could get a fairly accurate idea of what this particular kind of contamination amounted to. Some of the experiments and their results are as follows:

1. *Exposure to air in the stable.*—two liters (about two quarts) of sterilized milk were placed in a sterile pail and exposed seven minutes to the stable air in a passageway behind the cows. This stable was doubtless cleaner than the average and the air contained less dust than is often found in places where milk is being handled. Immediately after this exposure, the milk was "planted" and we found it to contain 2,800 bacteria per cubic centimeter (about fifteen drops); in other words, between 5,000,000 and 6,000,000 bacteria had fallen into the two liters of milk in this short time.

2. *Pouring milk.*—When milk is poured from one vessel to another, a very large surface is exposed to the air and great numbers of bacteria are swallowed up. The following tests illustrate this point: About five liters of milk were poured from one can to another eight times in the stable air. It was found, after pouring, that this milk contained practically 100 bacteria per cubic centimeter more than it contained before pouring; in other words, about 600,000 bacteria had gotten into the milk on account of this exposure.

In another similar experiment, when there was a little more dust in the air, the contamination due to pouring eight times was two and one-half times greater than in the preceding experiment.

The importance of pouring milk as little as possible from one vessel to another has suggested to Dr. J. Roby of the Rochester Health Department that milking pails should be made larger than those now used and immediately closed after the cow has been milked. The milk should then be cooled and delivered in these same pails without further exposure. In some ways this suggestion is a most excellent one, and it may be that under certain conditions, the disadvantages of this method of handling milk, would exceed the advantages.

3. *Contaminated utensils.*—Much contamination of milk results from putting it into dishes that have been cleaned and then exposed where dust can fall into them. In experiments to determine what this kind of contamination amounts to, it has been found that when little care is taken to protect the dishes, the milk will often contain several hundred times as many bacteria as when the utensils were protected from dust. In order to illustrate this point, two pails were carefully washed and sterilized. One of them was covered with sterile cloth to keep dust from falling into it. The

other was left exposed to the air of a clean creamery for only a few minutes. A small quantity of sterile milk was then put into each pail, rinsed around and then examined for numbers of bacteria. It was found that the milk in the pail which was not protected from dust, contained 1,600 more bacteria per cubic centimeter than the milk in the protected pail.

4. *Contamination from the cow's udder and body.*—Great numbers of bacteria fall into the milk when it is being drawn from the udder, because the milking pail is directly under the udder which is being shaken more or less by the milker's hands. This kind of contamination may be reduced by cleaning the udder. For example, it was found that sterile milk exposed under the udder as long as it takes to milk a cow and while the udder was being shaken about the same as when milk is being drawn, contained 19,000 bacteria per cubic centimeter. In this case the udder had been wiped off with a dry cloth much in the same way as is done in fairly good dairies.

In a similar test, the udder was wiped with a damp cloth and then the number of bacteria was reduced to 4,500 per cubic centimeter. In a third

FIG A.--How dust gets in the milk with the old-fashioned milk pail, and how it is kept out by the new-type covered pail.

experiment the udder was wiped with a cloth dampened in a 4 per cent. carbolic acid solution; then the number of bacteria was 3,200 per cubic centimeter. In cases in which no particular care is taken to clean the udder, the bacteria getting into the milk from this source may run up into the hundreds of thousands or millions.

5. *Importance of small openings in milk pails.*—Thus it is seen that it is impracticable to clean the udder or free the air from dust so perfectly that *no* bacteria will fall into the milk. The next question is, how can we reduce the number of those that will fall in spite of all reasonable precautions? The easiest way known is to use a small top milking pail. Reduce the opening through which dirt can fall into the pail. An experiment was carried on to illustrate this point, and it was found that milk drawn in an ordinary milking pail contained 1,300 bacteria per cubic centimeter, while that drawn in a pail with opening about one-half as wide, contained only

320 bacteria per cubic centimeter. This is just what we would expect when we compute the number of square inches through which dust can fall into the different kinds of pails. For example, a pail having a top 14 inches in diameter has an opening of 153.86 square inches; a pail with 12 inch top has an opening of 113.04 square inches; one of 10 inch top has an opening of 79.79 square inches; a pail with an opening of six inches in diameter has an exposure of 28.26 square inches. Figs. 167, 170.

Milkers should get into the habit of using the small top pail as it is one of the easiest of all ways for reducing the number of bacteria that fall into milk.

6. *Contamination by flies.*—A fly or a bit of hay or straw or a piece of saw-dust or a small hair, may carry enormous numbers of bacteria into milk as is shown by the following experiments:

FIG. B.—Diagram showing size of openings in various kinds of milk pails. The large circle at the left represents the common milk pail. The others show the perpendicular exposure in the new kinds of pails.

A living fly was introduced into 500 c.c. of sterile milk. The milk was shaken one minute and it then contained 42 bacteria per c.c. After 24 hours at room temperature, it contained 765,000 bacteria per c.c., and after 26 hours 5,675,000.

7. *Dirt in the milk.*—A piece of hay about two inches long was placed in 500 c.c. of sterile milk. The milk was shaken one minute and it then contained 3,025 bacteria per c.c. After 24 hours at room temperature it contained 3,412,500 bacteria per c.c.

One piece of sawdust from the stable floor was put into 500 c.c. of sterile milk. The milk was shaken one minute and its bacterial content was then found to be 4,080 per c.c. After 24 hours at room temperature it was 7,000,000 per c.c.

A hair from a cow's flank was put into 500 c.c. of sterile milk. After shaking the milk for one minute it contained 52 bacteria per c.c. After 24 hours at room temperature it contained 55,000 per c.c., and after 36 hours, over 5,000,000 bacteria per c.c.

III. FURTHER NOTES ON CARE OF FOOD.

By Miss M. Van Rensselaer.

A knowledge of germs as given in Bulletin No. 12 of the Farmers' Wives' Reading-Course and in the foregoing pages of this Bulletin, makes us stop to consider what opportunity there is for these little enemies to do their work. The most painstaking housewife needs to have her faith shaken occasionally in her own carefulness concerning foods. Thoughtfulness, with a knowledge of results of careless habits, will bring many things to our notice to which we have closed our eyes. Yet it is not wise to become finicky or too fearful lest we shall get something which we should not, thus destroying our peace of mind. It is harmful dirt we need to shun. Probably the guest who stood on an upper balcony of a hotel and saw an employee come

into the kitchen, remove his pipe, lift a spoonful of preserves to his mouth, place the spoon back in the dish and resume the pipe, would have been happier had she not seen the episode. She was not in a position to remedy the difficulty, as she might in her own home.

Sometimes difficulties must assume large proportions before we are much aroused to the necessity for reform. If only the mouse gets into the flour it can be got along with: but the *cat*! For illustration, this story is told in a New York paper: "A prominent politician has a wife who is a model of domestic carefulness. She has a talent for making bread, and takes great pride in having her loaves turn out well. One evening she had set the batch of dough to rise in the kitchen, and was reading in the parlor, when her six-year-old boy came running to her, saying: 'Mamma, Mamma! There's a mouse jumped into your bread pan.'

"The good woman sprang from her seat.

"'Did you take him out?' she asked, frantically.

"'No'm, but I done as good. I threw the cat in, and she's digging after him to beat the band.'"

The moral is that one uncleanly habit should not be used to correct another.

The milk was not looking quite right and the housekeeper interviewed the milkman. Many hairs and much dirt in the milk was the complaint. "Oh well," he said, "I have to hire my milking done and you know how it is, they won't always be careful; I have told the man if the cow stepped into the pail to throw the milk away, but he won't always do it unless he is watched."

The baby whose mother chews the cracker before putting it into the baby's mouth is still the loving and trusting infant, even if he is imposed upon. Older grown, there is a repugnance for having the same family cough-medicine bottle, from which each takes direct from the bottle, or for the testing of soup and other eatables and putting the spoon back into the dish. Germs are easily transferred from person to person by such thoughtless habits.

Care of the Animals.

It is a great thing to be a producer of clean products. The farmer and his wife hold the key to the health not only of their own family, but to that of those who consume the produce of the farm. Some advertising firm says, "Tell me what you eat, and I will tell you what you are.' We may to some degree say this of the hen or pig. A hen fed on good wholesome food has better meat and lays better eggs than those that pick in the compost-heap; and a pig that is kept clean as to surroundings and is given wholesome food is better eating than if it is allowed to wallow in the dirt to eat only refuse. Really, a pig would be a clean animal if given a chance.

Although the horse is notably clean in its habits and feeds on grains, we eschew horse flesh; but we eat pork, which, if not grown in a clean place and given clean food, should not be appetizing. The limit of dirty food is expressed by saying, "It is not fit for hogs." Pork is unobjectionable when the flesh is produced by clean feeding, but even then it should be used under proper limitations of quantity and season.

The cow needs not only wholesome food, but to be kept clean. From the time the milk leaves the udder there is danger of contamination.

Look first on this picture.—A milkman dressed in clothes brushed clean, his hands washed in soap and water, not simply rinsed at the trough, finger nails short and clean, the cow curried, the udder washed, the pail covered

until necessary to milk, the stable clear of all dirt. *And then on this picture*:—The cow lying in her own dirt over night, udder soiled, milkman dressed as he has been while doing all sort of work, the cow's tail switching and the dirt flying, flies bothering the cow until she kicks,—if not into the pail, it is only by careful management that she is prevented from doing so.

Milk produced in this latter way is hardly worth buying, while for that of the first milkman we can afford to pay a good price,—enough to encourage a man to keep clean and to have clean stables and cows. Pay enough to allow the farmer to secure cement floors, tight ceilings, good ventilating devices, and general cleanliness. Then he will scrub his floors and hang up his milking suit to use only for that purpose.

"We always strain our milk, and the dirt and hairs are removed," say some. Yes, but we do not like to eat bread that the mouse ran in, even if the mouse has gone. A good part of the dirt is soluble and cannot be strained out. Throw away the first half pint of milk, or run the risk of giving it to the cat. A diseased cow! We think it not profitable to throw away milk, but consider the danger of infection to human beings! It is safe to watch the cow in order not to use the milk of one that is diseased.

The water a cow drinks should be clean and pure. It should be free from disease germs, for these may get on the utensils and into the milk. We have only to think of the infants whose only food is milk, and of the diseases which may come from bacteria in impure milk—cholera infantum, typhoid, scarlet fever, tuberculosis, diphtheria, and countless cases of indigestion.

Care of Utensils.

The thorough washing of pans, kettles and cans, makes housework and cooking far from easy. It is not so difficult to do the cooking when someone else does the cleaning up. The fewer the creases in a cooking utensil and the more they are scalded, the better. Sun and hot water are most beneficent agencies for the safe care of these articles of kitchen warfare. The housekeeper who cans fruit is extremely careful to sterilize her cans in order that the fruit may keep. With something of the same spirit she will keep her milk pails, cans and pans in like condition.

The utensils introduced of late for the care of milk are most interesting. This is especially true of milk-pails. Instead of open pails, there are pails with covers and small openings to receive the stream of milk. Sterilized bottles, on account of being closed, are a very safe receptacle for the milk intended for market. All of these precautions in regard to milk are well worth while, for milk being drawn from an animal is very easily subjected to dirt, and it is an excellent breeding ground for germs. Neither do we boil the milk as we do most other foods.

Who does not remember in the old-fashioned regime of housekeeping, the rows of pans nearly filled with milk, which were set on the pantry shelves? In the light of our knowledge of dust and its dangers, we are glad this has passed; it has given place to smaller surfaces to receive the dust, or no exposed surface at all.

The refrigerator might be called upon to tell many tales of the life history of germs, for its recesses hide a multitude of secrets. Slime left where the ice was melted points to need of care. The spilling of food on the shelves is another source of trouble. Ice should be well washed before being placed in the refrigerator. All bits of food should be removed from the shelves and crevices, the refrigerator often washed and scalded, and some antiseptic, as washing soda, used.

Food Exposed to the Air.

The exposure of food both in the home and in the market to flying dust is much to be condemned. While it may be difficult to cover all the left-overs and the food in process of preparation, one has only to think again of dust and its dangers to realize that the surfaces of this food will catch many flying particles and germs which we would rather not have made a part of our diet. It merely means thoughtfulness on the part of the housekeeper to correct some of the habits to which we have become accustomed and habitually follow. Probably if the bread were not left unprotected, the mouse would not have jumped in; but we can see the mouse in time to avoid making him a part of our meal, whereas the obnoxious germ is so small as to escape attention. A table filled with left-overs, waiting to be prepared for the next meal, is a veritable dust-garden, and who knows what additions have been made to our diet?

Uncovered meat and groceries delivered in an open wagon through the dusty streets are not very clean when they reach the kitchen. Of course sufficient heat applied to them may kill anything dangerous, but again we are led to think that we do not want dirt in our food even from which the germs have been killed. Patronize a covered delivery wagon and a grocery in which provisions are kept under cover in preference to those in which the provisions are exposed to the air. This will pay in our peace of mind as well as in the safety of the food.

BRIEF DISCUSSION OF HUMAN NUTRITION.

(Copied from Bulletin 13, Reading Course for Farmers' Wives, by courtesy of Prof. L. H. Bailey, Cornell University, Ithaca, N.Y.)

We must eat to form and maintain the fluids and tissues of the body, and to furnish fuel to yield heat or energy. Food must supply the material which is consumed with every motion of the body and the exercise of every function. All energy, either intellectual or that manifested in physical action, comes from the energy stored in the food. This energy is liberated in the chemical changes which transform the food into the substances used for specific purposes. One's proper food should contain the materials which will build up the wasted muscles and best supply this energy. All food materials do not contain the necessary elements in the proper proportions for the fulfilling of these two general functions.

"Food may be defined as anything which, when taken into the body, is capable either of repairing its waste or of furnishing it with material from which to produce heat or nervous and muscular work."—*Hutchison.*

There must be sufficient variety in the food to do all that the definition quoted states. One food may not do it all. It is by a combination that we secure this result.

1. The Constituents of Food and their Value as Nutriment.

For the building and repairing of muscles and bones and supplying heat and other forms of energy, the food must contain (1) protein, (2) fats, (3) carbohydrates, (4) ash.

Protein is a name given to a large class of food constituents which nourish the blood and the muscles and in general repair the waste of the body. Protein always contains the element nitrogen, and nitrogen is

always a constituent of the blood, the muscle and the bone. It is the only class of substances which can serve for the building and repair of the body. Protein may yield energy, but under ordinary conditions it is too expensive to be used for this purpose. Examples of substances containing protein are lean meat, the white of eggs, the curd of milk, the gluten of wheat, peas, beans, lentils.

Fats and oils aid in digestion and supply heat and muscular energy. The fat of meats, often so carefully removed and ignored, butter, oils of vegetables, etc., may serve for furnishing the fat stored in the body or used as a source of heat. Of the meats, veal has the least fat and pork the most. Cheese contains as much fat as it does protein.

Carbohydrates.—This group includes the starches, sugars and gums, and similar chemical bodies, substances which, like fat, furnish heat or energy to the body. Carbohydrates contain no nitrogen whatever. Therefore, they can not replace protein as a tissue builder. Carbohydrates and fat are needed by the body and the amount required is larger than the amount of protein. Carbohydrates supply heat to the body the same as fats but to a considerably less degree. About two and one-fourth pounds of starch and sugar are equivalent to a pound of fat in producing heat. Fats and carbohydrates are often called energy-yielders, since they are used to keep the body warm and to enable it to perform work.

The body is constantly wearing out and needing to build up tissue, hence the necessity of the protein. However, as heat and energy are to be supplied as well, a certain amount of the carbohydrates and fats must form a part of the diet. If they are omitted, the body depends upon the protein to too great an extent. Seventy-four per cent. of the heat-producing foods are said to be needed daily for the proper balance.

Ash, salts or mineral substances.—Every well-regulated diet should contain the mineral substances necessary for the building and repairing of bones and other parts. Milk, meals, cereal products, vegetables, especially the leaves, all contain the phosphates and lime which go to make the mineral part of the bones. Chemically pure sugars, starches and fats contain no ash whatever, hence a diet entirely of these substances, if such a thing were possible, would furnish no food for the growth and repair of the bones. Neither would it supply the protein which is essential. The ordinary mixed diet, it is generally considered, contains a sufficient amount of ash constituents for the needs of the body.

Water.—A large proportion of the weight of the body is made up of water, and water must be furnished to the system in order to keep up the supply. It is not usually taken into consideration as a nutrient. One of its chief uses is to dissolve the food constituents, and to carry them through the body.

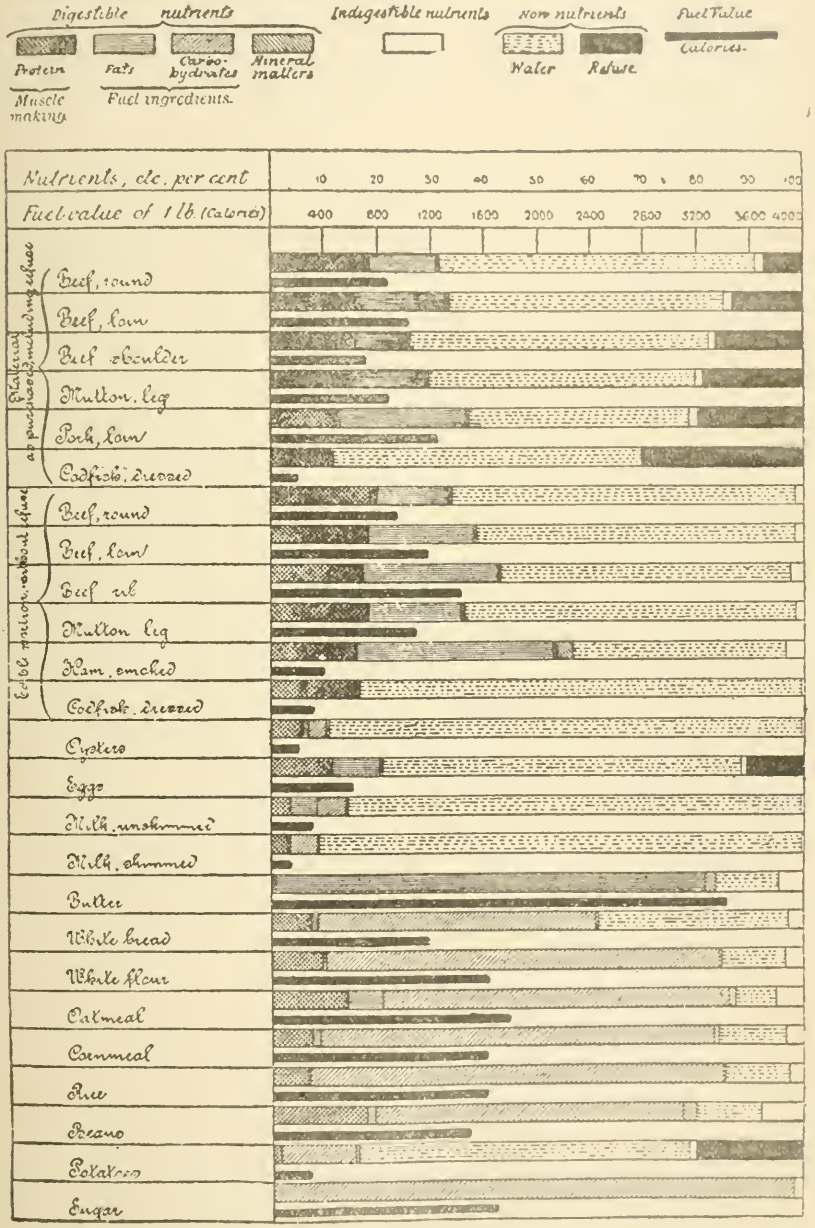
Refuse in foods.—Foods have a varying proportion of *refuse* (portions unsuited for eating) from the 10 per cent. in a round of beef to the 50 per cent. of fish. Examples of refuse are found in bones of meat, oyster shells, apple cores, etc.

The balanced ration should contain the proportion of protein, carbohydrates and fats which will produce the best results. Occupation, temperament, climate, personal peculiarities of digestion vary, making it impossible to form a fixed rule for all cases. The heat of the body is derived from the energy stored in the food. The changes through which the food goes, liberate this heat. The amount of heat that a food can yield is there-

fore one measure of its value. The amount of heat which various food materials yield when burned has been determined, and for some substances can be found in the table below.

COMPOSITION OF FOOD MATERIALS.

Nutritive ingredients, refuse and fuel value.



A unit of heat measure is a calorie. A calorie is the amount of heat that will raise the temperature of one gram of water (about 1-30 oz.) through one degree Centigrade or one and one-fifths degrees on an ordinary or Fahrenheit thermometer. If a food, for example, yields 1,500 calories, it means that the heat from burning one gram of that food could raise the temperature of 1,500 grams of water through one degree C.

The standard amounts of the different nutritive constituents required daily by a man of average build and weight differ according to various authorities so far as fat and carbohydrates are concerned, although the amount of protein is similar in all. The standard proposed by Professor Atwater, for a man at moderately active muscular work, requires 125 grams (4 1-5 oz.) protein, with fat and carbohydrates enough to make the energy value 3,400 calories.

We obtain the needed nutrients in due proportion by combining foods. Very few substances contain the different nutritive constituents in proper proportions, nor do we consume food in the form of pure protein, carbohydrate and fat. Allowance must also be made for imperfect digestion and for waste, as, for example, the potato, pared before boiling, where there is a waste of about 35 per cent., and sirloin steak, where a waste of 25 per cent. The preceding table may be consulted to find more accurately the composition and value of some common foods used in the daily bill of fare.

2. Some Common Articles of Food and their Value in the Diet.

Milk forms a complete food for infants and a comfortable one for adults for a limited time. The athlete would find a milk diet altogether unsatisfactory, while in sickness it might be all that is required. The principal foods derived from milk, as cream, butter, cheese, buttermilk, whey, etc., have special values and help to make a balanced ration. Skimmed milk and whole milk contain about the same amount of protein, hence the former is more economical, but its fuel value is small because of the small amount of fat it contains. Milk is the food of our first experience and a complete one until more is expected of us than of young children.

Beef and mutton are more rarely found on the farmer's table than in a diet of families living in towns, being replaced to a considerable extent by salt pork. However, the farmer needs material for building muscular tissue, such as is found in lean beef, as well as the energy which is yielded by fat pork. Lean pork is directly comparable with beef and mutton and is a tender-fibered meat. All meats contain fat. Whether lean or fat pork are digestible depends chiefly on the person. So far as scientific investigations show, pork from healthy animals is a wholesome meat. Bacon is thought by many to be more easily digested than fat salt pork, and ham still more so. When thoroughly boiled and eaten cold, cut in thin slices, ham is less likely than fried ham to cause distress with persons whose digestion is not normal. Fresh fish undressed contains a large amount of refuse and water. The percentage of nutrients in dressed fish is higher. Dried fish has a higher percentage of nutrients, as is the case with dried beef, such foods having been concentrated by evaporating the water (juice) originally present.

We cook meats largely to loosen and soften the tissues that the digestive juices may the more readily act upon them. Cooking also kills molds and micro-organisms and animal parasites or their eggs, if they are present. Cooking also causes the starch grains to swell; and changes the condition of some of the protein substances.

Potatoes appear on the farm table in a great many houses three times a day, although they do not contain a large amount of nutrition in proportion to their bulk. This is not altogether a disadvantage, since potatoes are much cheaper than many concentrated foods, and, furthermore, it is a general practice to dilute concentrated foods before serving them. Rice and oatmeal, for instance, are generally cooked until comparatively moist before serving. A cooked potato contains not far from the same amount of water as boiled rice. Potatoes are readily digested when properly cooked. They are easily cultivated and rank high as food. It would be necessary to use the potatoes in undue quantities to secure the amount of protein necessary for a well-balanced ration, however. It contains large quantities of starch, and when served with meat, fish, or eggs, etc., it helps to make up a well-balanced diet. Well-cooked, mealy potatoes are believed to be more easily digested than those which are poorly cooked. Potatoes baked with their skins on are thought to be more easily digested than those cooked in other ways. To secure the highest food value, potatoes, if boiled, should not be peeled before cooking. If peeled potatoes are placed directly in hot water and boiled rapidly, less material is lost than when they are placed in water cold at the start. If potatoes are peeled and soaked in cold water before boiling, the loss of nutrients may be very considerable. When potatoes are boiled with the skin removed, the greatest loss seems to be due to the mechanical abrasion of some of the soft outer portions while cooking. It is evident that, if it is desired to boil potatoes with as little loss as possible, the skins should be left on. There are probably few cases in which it is necessary to take account of the losses due to different methods of boiling potatoes, or where the possibility of loss would outweigh the liking for them prepared in some particular way. But in institutions where a large number must be provided for, and, in fact, under any condition where rigid economy is necessary, the matter may assume considerable importance.

Bread.—In the housewife's cooking, probably the most important article is the bread. The art lies in right management of the dough and baking at the right period. Fermentation may be arrested too soon and tough bread follows; or fermentation is allowed to continue too long and sour bread is the baneful result; while too old flour, adulterations of bitter yeast may be the cause for trouble; it may become sodden from being covered too soon after coming from the oven and not allowing the moisture to evaporate. Bread made from good flour should be porous, not too much so, and should have consistency and firmness. Mixing fat with flour has the tendency to prevent the evaporation of water.

Pastry, biscuit, puddings and cake are prepared on much the same principle as bread, and with various proportions of fat, sugar, flour, eggs, etc. These are for the consideration of the strong and only a temptation to dyspeptics.

Of the farinaceous foods, *oatmeal* is perhaps the heartiest. Like buckwheat, it is best suited to those persons much out of doors. As a cereal it is largely used in the northern states, but it is often badly cooked in hotels and boarding-houses, when it becomes a trial to the consumer. It needs very thorough cooking, and when ready for the table should be of the consistency to allow of pouring; when cool, it should be tender and gelatinous. Wheat and oat breakfast foods furnish more protein than those from corn. They are in greater favor, too, in the northern United States, than corn, which contains more fat than the wheat. Cornmeal mush and milk is a

wholesome, old-fashioned dish which deserves more popularity than it has at present.

Rice forms a favorable part of the bill of fare. It contains more starch than other cereals, and if properly cooked, so that the kernels are softened —as can be accomplished by steaming—it is very digestible. The addition of butter prevents the kernels from gathering into a pasty mass. When eaten with meat, the protein, which the rice lacks, is supplied. Combining milk and eggs with rice, as is frequently done in making puddings, etc., is a common way of supplying the protein which is lacking in rice and furnishing a more properly balanced article of diet.

Vegetables.—Nearly all farm tables contain, besides potatoes, some vegetables. In the winter they are often only those which keep well, such as turnips, cabbage and beets. The green vegetables, celery excepted perhaps, are necessarily confined to their season, and then not largely used in many homes. The green vegetables afford a pleasing variety, but not a very large amount of nutriment for their bulk. The large amount of water which they contain is useful, and they are not without their value in furnishing serviceable salts to the system. To follow an exclusive vegetable diet may imply a loss of strength and inability to resist disease, but it is generally believed that a more healthful equilibrium is maintained by a reasonable use of vegetables and meats.

Fruits.—It is refreshing to have a safe indulgence, and fruit is like a gift of the gods. It refreshes, stimulates, regulates and nourishes. It is as desirable in its abundant and cheaper varieties as in its less common and more costly kinds. From the time of the first man to the small boy under a green apple-tree, fruit has not been without its tendencies to trouble. It is highly beneficial as a common article of diet, but used with too much freedom, especially when much under or over-ripe, it is certain to cause trouble. Personal peculiarities prevent any fixed rule regarding the digestibility of fruit. In general, cooked fruits are valuable with a meal, while fresh fruits are often most beneficial when taken alone or before or between meals. The composition of fruit is largely water, sugar and a little acid.

3. Age and Occupation Determine the Diet.

The Dietaries for the children.—The rapid growth of the child necessitates a good supply of muscle-making and bone-forming food. Besides, children are perpetually active, and energy-producing foods are necessary. Most children are fond of cream and butter, which furnish for them a good supply of energy-yielding food. Growing children need an abundance of phosphates, lime and other minerals which enter into the bones, and are also used in forming the organs of the body. These are found in the green leaves of vegetables, in fruits, in cereals and in legumes. Milk and eggs, especially the yolk, furnish much of these materials.

The child should derive protein from milk, etc.—No doubt the necessary protein for children should be derived largely from milk, and other sources than meats, up to about four years of age. Then the amount eaten depends much on the activity of the child. Oatmeal and similar products, wheat (as breakfast foods, flours and macaroni), cornmeal and hominy, and similar foods, are all good vegetable sources of protein in place of too much meat.

Fat should be supplied to children liberally.—Sometimes children will not take as much fat as is for their good, but one should endeavor to supply

it in form of milk, olive oil, cream and butter in the food, in addition to that used on the bread.

Sugar furnishes heat and energy. It should be given to children in moderation, although, no doubt, many of the objections raised to giving a child sugar are not well founded. It is supposed to injure the digestion if taken injudiciously. Only pure sugar should be used, and it should be taken with the meals. Heavily sweetened cereals and "made dishes" should be avoided, and sweets should not take the place of butter and bread, so essential is fat and starch in the diet of the child.

Water, if pure, is the best beverage for a child.—Avoid alcohol; and to a nervous child tea and coffee are harmful. Cocoa, which has considerable food value, is a good substitute for tea and coffee. It is most digestible in the form in which the fat has been removed, and most nourishing made with milk. Pure milk is also an excellent beverage as well as food.

Careful habits in eating should be formed in children.—Slow eating and thorough mastication are essential. Milk especially should be taken very slowly to prevent curd forming in masses in the stomach. The diet should be simple but varied, as indicated by the necessities referred to above, to supply enough energy, and not only the material needed for constant repair but also food for growth. The habit of eating irregularly should be avoided. Frequent small meals are possibly more satisfactory than fewer and larger ones, but the stomach should not be kept in constant activity. Intervals between meals should not be too long.

The children's lunch-box.—As hinted above, children need to eat oftener than grown people, but, with the usual school plans, the child eats an early breakfast, and if he can not return home at noon, has a cold lunch at school. It is essential that it contain nourishing and wholesome food, such as bread and butter, eggs, cold meat and fruit, with not too much of a supply of starchy and sweet foods, in the way of cookies, cakes and pie or of such articles as pickles. There is great need of attention to this part of the child's life.

Care should be exercised in the diet of old people.—Perhaps nature in depriving old people of their teeth intended to lead them to give up meats and hearty foods. At any rate, they do better on food which is easily masticated and digested, eggs carefully cooked, milk, cream, soups, chicken, etc. The power to assimilate is decreasing, and there is less activity as years advance. For this reason less food is required.

Over-eating and over-feeding lead to bad results.—One of the necessary requirements throughout life is to adjust the equilibrium between the actual needs of the body and the amount of food consumed. One may really better leave a table desiring more food than to leave it with an overloaded stomach. The dessert is often not reckoned on as a part of the meal to satisfy the needs of the body, but is taken as a matter of habit or to please the palate. In cases of overeating, the system becomes eventually impaired from having too much to do, and often persons suffer from being over-fat or from disease.

While the protein in foods builds up and repairs the muscular system it may, if taken in too large quantities, unduly tax the digestive and excretory organs. Too much fat and carbohydrates must be burned, or stored in the body as fat. Still a slight excess of nutrients may be considered harmless and often is the reserve upon which one may rely when deprived of food at the usual time. Furthermore, an excess one day is likely to be counterbalanced by a deficiency the next.

Bad effects come also from underfeeding, and the body becomes unable to resist disease. It has an effect as well upon the mind and on the spirits of a person, causing him to tire easily and to become "out of sorts." It has contributed to crimes in leading to morbid conditions of mind and body. A woman, therefore, is no doubt preventing more trouble than she dreams when those for whom she strives are well fed.

Occupation should determine to some extent the diet.—The housekeeper may have at her table both those who lead a sedentary life and those whose activities are mainly manual, as with children in school and a husband in out-of-door labor. The amount of physical labor is the great factor which determines the amount of food required. If possible, it is desirable for all to rest a little immediately after eating. The brain worker, since he is generally engaged in little physical work, should eat less than the out-of-door worker. The fats used should be in the form in which they occur naturally in cooked meat not overfat, in olive oil, cream or butter, as they are easily digested. The necessary carbohydrates are supplied by cereals, sugar, etc., and protein by heat, with eggs, milk, cheese and cereals. Brain workers should be careful to avoid overeating and heavy, hearty foods. An abundance of the fats, sugars and starches is very necessary in the diet of the manual laborer to supply him with heat and energy for work as well as muscle-making food, *i.e.*, protein, to make good the wear and tear of the body.

4. The General Problem.

It is not expected that this article will give the reader much detailed working knowledge of human nutrition. The subject is too large and too complex for that. But we hope that it will be sufficient to challenge the reader and to draw attention to the fact that there is such a thing as rational practice in human nutrition. The men of the household may have taken up the question of rations for cows. It is just as important to study human nutrition as to study the feeding of live-stock. Perhaps the housewife provides a certain round of food as a matter of habit, and has not thought whether it is well adapted to the persons for whom it is prepared. You may not make much definite use of the table on page 95; but the very fact that the table is there will impress upon you the other fact that foods differ greatly in their values for different purposes and different uses. We hope that you will learn at least what the nature of the problem is.

Topics for Discussion at Monthly Meetings.

1. (*a*) Discuss the meaning of protein, carbohydrates, fats. (*b*) Consider what foods furnish these ingredients. (*c*) What proportion of each is needed for the proper diet?

2. Apply the principles to the daily fare generally used in the home.

3. Discuss what substitutes may be had for meats to provide protein and necessary nourishment.

4. Consider the effect upon the system of carbohydrates and fats.

5. Discuss the amount per week necessary for feeding each person in the family. Can this amount be lessened and furnish necessary nourishment?

6. Can cooking be done with less time and labor without detriment to the bill of fare?

7. Discuss the dietary for different members of the family.

8. How can good food habits be secured in children? Discuss the question of school lunches.

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PAPERS READ BEFORE LOCAL INSTITUTES THROUGHOUT THE PROVINCE.

WOMAN AS A CITIZEN.

By Miss E. M. Cullis, Powles Corners.

(Read before a branch of the East Victoria Institute.)

According to the definition of the word citizen, furnished by a man, woman is not a citizen at all, or at least most varieties of her are not. He says that a citizen is one who has a right to exercise the franchise of his country. But Webster, the refuge of the doubtful, gives us room for hope. He says that a citizen is a free man, or an inhabitant of a city. We have no record of Paul the Apostle ever going to the polls, but he claimed to be a citizen of Tarsus.

If woman is a citizen, in what does her citizenship consist? Not many of us have the privilege of voting, even for a school trustee.

To vote, or not to vote is a burning question just now with a certain class of women in England, as it is periodically among our neighbors to the south. I question though whether it will ever be a supreme issue with us. Even among those who may vote, how many would go to the polls, unless for some matter of conscience, or because of the extreme urgency of a candidate for office.

Setting aside the question of the franchise altogether, a woman owes it to herself, to her family, and to her country to have an intelligent grasp of the system of government of her country, its laws and its relation to other countries. She need not be a politician,—that name having come to have a rather sinister meaning—neither should she be a partisan, but she should be able to recognize wise legislation, whether advanced by one party or another.

The woman whose interests are all at home becomes narrow and cramped. Her conversation is confined to the affairs of her own household, the virtues of her children, the faults of her servants, or the failings of her neighbors. I fancy some of you say, "Oh, its easy for you to talk, but I have too much to do to bother about legislation or any other 'ation.'" By the time I have cooked and cleaned, washed and ironed, made and mended for my family, I am used up." It is just here where so many mothers make a mistake. I remember one woman who toiled like a slave, and dressed like one too, who gave as a reason for her drudgery, that she was going to make

a lady and a gentleman of her boy and girl. The world has no need of such ladies and gentlemen as her children are likely to become,—snobs who would despise the mother who had made them such. It does, however, need true men and women.

The next mending and darning night, just let Johnny and May do their own mending and darning, while you freshen up your knowledge of current events. It will do you good, and they will be even more benefited. Some day they will bless the memory of the mother who insisted on making them independent. In five years no one will know whether Mary's pink muslin had one frill or five, or even that she ever had such a garment; but to the last day they live, your children will remember with gladness, or regret, that you were either a bright intelligent guide and companion to them, or the opposite.

Not many men care about living with a "blue-stocking" or a "dictator," but every husband likes his wife to be able to converse intelligently with his friends. and many a time a wise word from her turns his judgment for or against some question of which he was in doubt.

"Your vote and influence" is the way the canvasser puts it. I wonder how we would feel if we could see just how our use of our citizenship influences others. We are neither aliens nor outsiders, but we are here that our lives may be an uplifting influence and that our country may be the better because we have lived in it.

THE FARMER'S WIFE AND FARM LITERATURE.

By Mrs. W. M. Shields, O'Connell.

(Read before the East Simcoe Institute.)

This beautiful Canada of ours is a grand and progressive country. True, she is young compared with others in the eastern hemisphere, but time will mend that. How wonderfully Canada has developed in recent years! Think of her lumbering, her mining, her fisheries, her agriculture. Think of her vast Northwest, once an unknown region, now covered with a network of railways. Think of the thousands of settlers travelling on these railways and making homes for themselves in the various provinces known as the Northwest. Think of the thousands of homes in Eastern Canada as well—homes literally hewn out of the great forests of early days—homes of the farmers on whom Canada depends for so much of her success. The whole economic structure of Canada has for its foundation the agricultural community. Truly, the mainstay of Canada is the farmer, and the mainstay of the farmer is his wife.

In farming, more than in any other calling, can the wife be a help or a hindrance to her husband, so to ensure a success there must be co-operation between them. Knowledge may be gained in many ways: by success, by failure, by experience either of their own or of others, by reading. The progressive farmer himself will benefit by all these means, and will avail himself of the experience of others through the printer's art. His wife will do likewise in her own particular line, and there is no reason why a woman living in the country should not be as well-informed on domestic and other subjects as a woman living in a city. We all know there are many branches on a farm which are connected with the housekeeper, such as dairying, calf-raising, chicken-raising, bee-keeping, and so on; and to help to make these

a success she must help intelligently, using both her brain and her commonsense. And to learn the best ways of doing things she must keep in touch with literature—reading what others do, trying to improve on their plans, and to adapt their ideas to her own particular case, avoiding their mistakes, and profiting generally by their experience.

The woman of long ago did not benefit in this manner, as the literature of early days was limited. Printing-presses were considerably fewer in number, consequently fewer books were to be got. Railways were almost unknown; hence there was little chance for the circulation of reading matter. The woman of 1807, as compared with the woman of 1907, was pretty much what the old stage-coach would be if placed alongside the automobile. Both vehicles could get along, but how much more easy and rapid is the progress of the modern machine? All honour to the woman of long ago! She did her best, labouring under difficulties of which we know scarcely even the name. So we see how fortunate is the woman of to-day in having so much reading to choose from.

The daily and weekly papers contain many paragraphs which are very useful. There also are magazines entirely devoted to the work of the farm: for instance, the *Farmer's Advocate*, the *Farming World*, the *Weekly Sun*, the *Canadian Dairyman*, the *Poultry Review*, etc. Besides, there are innumerable reports and bulletins issued periodically by the Dominion Experimental Farm at Ottawa, and the Agricultural College at Guelph. These in themselves are almost inexhaustible. What a large amount of information we may gather from the various reports published in these pamphlets!

The dairy and poultry bulletins are very valuable, and personally speaking, I should not like to have to do without them. But it is not how much we can read that is of any real help to us, it is the usefulness of it—the application of our reading that will benefit us. We might get through twenty books, and after all not be one whit the wiser, because we have read aimlessly. We must read with a definite object in view. Take again, for example, the dairy or poultry reports mentioned before. We cannot possibly remember all the hints and information given in them, but we may read them over first so as to get an idea of their contents, marking with a pencil any particular paragraphs which strike us, and lay the book aside to be kept for reference in the future. Then when the time comes that we wish to know some particular thing, all we have to do is to get the book, and we find at once the help we desire. Speaking for myself, I find it a very great benefit to keep all my dairy notes by themselves, and poultry notes as well. I keep them in the stiff covers of a large old album, where they are always handy for reference, and of great use to me. These notes, clippings, papers, and pamphlets cannot be referred to too often, and the various reports which come to the house are also placed in a safe corner, and are many and many a time hunted over, and special parts read and re-read, much good resulting.

And still further to help up to push on in the right direction, all we have to do when difficulties arise is to write to any of the Departments at either Guelph or Ottawa, and tell our troubles. A prompt and courteous answer is certain, and great help may be derived from advice given by one of the authorities on a particular subject.

It was Dr. Mills, late President of the Ontario Agricultural College, who, when addressing a Convention of Women's Institutes at Guelph some years ago, said, "We all need stirring up to observe, read, and think. This is the secret of success, ladies, in the home or wherever you may be. Observe—open your eyes and see, wherever you are, or wherever you go. Read

—great men and great women everywhere are great readers. The home without reading matter will be a barren home intellectually. Then think over what you read. We must look up and out for the inspiration that is uplifting."

If we can even in some measure follow Dr. Mills's advice, and observe, read, and think, we shall find as time goes on that we have improved along the lines by our observation, our reading, and our thought, and so prove ourselves better helpmates at home, and better women in every way, helping not only ourselves, but reaching out a willing hand to assist another in need of help.

HOME INFLUENCE ON THE YOUNG.

By Mrs. D. O. McArthur, Melrose.

(Read before the Melrose Branch of the East Hasting' Institute.)

Let me begin by opening up for you a home-scene,—a father, a mother, and a child. This picture constitutes a family, and the place where they habitually live is called the home. What a unit of human life, a family,—the father, true, upright, just; the mother, gentle, loving, kind; one in the common interest and responsibility of training the child given to them, in true and noble ways. Who can measure the blessedness of the home where parents in the midst of the many duties know that time must be preserved for the training and proper bringing up of the young? A home—leading the life of simplicity, naturalness, purity and unreserved friendship, each one living for the good, the uplifting and the happiness of the other.

A lady was asked the other day if the little lad who came into the home late, that is, after the other members of the family were pretty well grown up, was not in danger of being spoiled? The answer is very suggestive, "We are kind to him, but we make him obey." That is a good motto for parents, if they would wield the highest and best influence over their children, namely, "Kindness and Obedience." Show me the home where with the light of a mother's love, and a father's tenderest care; where gentleness, fondness, and kindness are continually exercised, and at the same time where the rule of implicit obedience is constantly enforced, and I will show you a home in which are found the sweetest graces, and most lasting influences.

Mothers, stop and think! what kind of training and influence are you exercising over the minds and bodies of your children? How many mothers can say, "this is the sweetest and grandest work in the world?" How many children have no real bringing up. There is no proper training. Like Topsy, "they just grow." The children go to the day school; influences are often not the best. Evil seed takes root quickly. In the Sunday School, the time—less than one hour each week—is altogether too short to counteract the effects on a life where no care or culture is bestowed. For a mother to leave the moral training of her child to the Sunday School teacher is the height of folly, and is doing the teacher a great injury by blaming her if she fails in her work.

Mothers and sisters, if the children in the home are peevish, and distrustful, who is to blame? Have we yielded, especially when company is present, to their sweet wills and to their every whim—their young minds changing ever, like the weather-vanes? Then is it any wonder if disobedience, and waywardness should characterize the home?

But you may say, "There are so many ways of influencing children, and there are so many in our family that I cannot always tell what is best to do. A look is enough for Mary, but if I give John an inch he will take a yard." Five villages lay on the other side of a forest. A traveller desired to go to A.——. And old lady in directing him how to go, said "you will keep right on until you get some ways in the woods, and you will come to a place where several roads branch off. Then you must stop and consider, and take the one that seems to you most likely to bring you out right." Just follow the worthy and sensible old lady's advice in bringing up your children. I do not think anybody can do better. Do what seems most likely to bring you out right.

But the years roll on, and in a short time the "wee laddie" will be a man. How are you going to treat him now? Or "Mamma's darling" is developing into womanhood. How are you going to act now? They are no longer little children. Impressions, habits, ideas, most abiding have been received from their parents. The opinions, which a man holds, the movements with which he identifies himself, the friendships he cultivates, the particular line of conduct he observes, words and looks as well as actions have had their effect.

How are you going to act now? Is it the old motto still "kindness and obedience?" Yes, just the same; no, not the same. You have got to the point now where you must not overstrain the necessity of obedience, where harshness and severity of demeanor are out of the question, for this is the lash, which, if used, will certainly with double force come down on your own back. You must show the young people that you are interested in their work, and also in their games. If your boy fails in doing a piece of work properly, show him how it could be better done, and tell him that he will do better next time. Your boy is disappointed at the loss of a game—cheer him up, and say "try again."

Above all things avoid the habit of always finding fault. The young people will not tolerate continuous fault-finding. A wise mother will not censure her girl, who has tried to do a work, and has failed. A word of cheer would be more to the point.

A boy's best friend is his mother, and a good mother will never cease to try to influence her "big boy" to habits of truth, virtue, righteousness and piety; for when once formed they will grow with his growth and strengthen with his strength. You have seen characters cut in the tender bark of the young tree; year by year these characters become wider and deeper. So it is with right principles imprinted on the minds of the young. Most people are what they are, good or bad, kind or unkind, virtuous or vicious, insolent or industrious, truthful or untruthful, courteous or uncivil, according to the influences during the time of childhood and growth. Much has been said, and all very good, about beautifying the home, but there is no picture that has the charms of the entwining of hearts in love, faith and obedience.

Much has also been said about "Music in the home," but there is no music like that of the family when all hearts are in unison, and beat as one heart.

A young man went into a departmental store and enquired of a lady clerk if they had any "Family Ties." The clerk said she would see. In a few moments she returned with the information that they had no "family ties," but that they had plenty of "Family Jars." "Don't require any of them," said the young man "we have plenty at home." Remember the Motto—"Kindness with Obedience," and you will not have any "Family Jars."

THE FUNCTION OF THE HOME IN EDUCATION.

By W. J. Dunlop, Tavistock, Ont.

(Read before the Tavistock Branch of the South Perth Institute.)

Let it be granted, first of all, that there is nothing more important than education—nothing more important to the child, to the parent, to the individual, to the State. The value of education is not to be measured in dollars and cents; it should never be lowered to such a mercenary plane. Education is not cramming a child's head with facts, but as its Latin root (*e*, "out of," *duco*, "I lead,"), indicates, it is the drawing out and developing of all the right faculties and tendencies which are already in the child.

A wrong impression of the purpose of education prevails very generally. Many people suppose that if their children's minds are getting crammed with isolated facts they are "getting along well in school." In educating the child, knowledge is imparted, but not for its own sake merely. Were the impartation of knowledge the be-all and the end-all in education, how dull, how purposeless, how mechanical would that education be! A child learns a certain amount of arithmetic, of grammar, of geography. He learns to read and to write, but this knowledge is a means to an end, and that end is the building of a strong character, the formation of right habits of mind, the development of the child's faculties.

As an illustration of this, consider your own case. How much do you remember of the rules of grammar? How often do you use a knowledge of advanced mathematics? Can you parse a perfect participle, or a gerundial infinitive? If you remember almost nothing of what you learned in school, of what use was your schooling to you? To answer that, remember what you would be had you never attended school. You have seen children who have seldom favored a school with their presence. Then your education is of value to you, not only because of the knowledge you received, but because of the training it gave you—a training which is always of benefit to you. The education you received in school was the preparation and the foundation for the broader, fuller education which you have since received by living among your fellow creatures. Then a teacher should not be one who doles out scraps of knowledge at a certain rate per diem, but rather a builder of character. Organized knowledge is practical, it is a source of strength, a reserve force which can be called into action in any emergency, but a mass of isolated facts is a source of weakness, a load to the mind, a resource which is sure to fail in time of need.

Pardon me if I quote you here a very famous definition of education given by Prof. Huxley: "That man, I think, has had a liberal education who has been so trained in youth that his body is the ready servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of; whose intellect is a clear, cold, logic engine with all its parts of equal strength, and in smooth working order, ready, like a steam engine, to be turned to any kind of work, and to spin the gossamers as well as forge the heavy anchors of the mind; whose mind is stored with a knowledge of the great fundamental truths of nature, and of the laws of her operations; one who, no stunted ascetic, is full of life and fire, but whose passions have been trained to come to heel by a vigorous will, the servant of a tender conscience; who has learned to love all beauty, whether of Nature or of Art, to hate all vileness and to respect others as himself."

In the days of our forefathers, education was a very different matter from what it is to-day. In those primitive times, all industries were carried

on in the home. The father was his own miller, his own blacksmith, his own carpenter; the mother made the cloth and performed the duties of a tailor. The father and mother had also to be teachers. In the home the child was taught to read and to write as well as the father and mother could teach him; in the home he received his knowledge of the Bible, his spiritual and religious education. The parents of those days took the entire responsibility for their children's education; in our day, as a rule, they take none. The State has control of education. To the school teacher the parents have handed over the responsibility of their children's intellectual education; to the minister or the Sabbath school teacher they have entrusted their religious education. Too many parents now take almost no responsibility except to keep their children well clothed and well fed.

For the first seven years of the child's life, he is almost entirely under the control of his parents. What he learns in those first years he never forgets. In those years the influence of his parents makes a lasting impression on his mind, an impression which no amount of teaching can ever eradicate. Then there is the great responsibility of the parents. The child is commencing the great race of life and it is their duty to see that he gets the best possible start. As the twig is bent, the tree will be inclined, and the parents must see that the twig is properly bent. This is a responsibility which they cannot transfer to anyone, which they should not wish to transfer to anyone. In these years begin to teach the child those great lessons which he will need through life; teach him integrity, honesty, uprightness; teach him to be truthful in great things and in small things, to be honorable, to be true to himself, to respect the rights of others. These things the s hool will teach him if it does its duty, but it cannot teach them to him as well as his parents can; the Church will also teach him these lessons, but neither agency can teach them with the same effect as when they are taught in the home, and the fact that the Church and the school will teach these things does not in the least lessen the responsibility of the parents. During these years you can determine the use the child is going to make of his knowledge which he gains in school. That knowledge will be a power, but will it be a power for good, or for evil? The parent decides that; the child's home training decides it.

When the child has reached school age he comes under the influence of the teacher and of the other pupils in addition to that of the parents. If you have by this time taught him the great lessons I have mentioned, the school will not spoil him. Contact with his fellow pupils will not spoil him, but if the home training has been bad or negative, the teacher will have a tremendous task to make that child what he should be, and, to such a child, contact with other children may be a detriment rather than an advantage. Besides having taught him the great moral lessons, the parents should now have taught the child that he is to respect and obey his teacher. No teacher has any trouble with a boy or girl who has learned the lessons of respect and obedience. Then there is another thing which the parents must teach their children if they expect them to make a success in education. Teach them that in school they are working for themselves, not for the teacher. From the first class in the primary room to the junior leaving class we have to struggle with the fact that the pupils don't realize that they are working for themselves, and that if they neglect their work they will suffer for it in after life. They do their lessons because their parents say they must, and the teacher says they must. It is the duty of the parents to hold before their children a high ideal, and encourage them to work

towards that ideal. Teach them that if they apply themselves they will be amply rewarded in later years.

I think I am safe in saying that most people teach their children absolutely nothing of school work before they begin to attend school. A few teach something, others are in doubt as to what they should teach. Now when I state my views on this question, I am aware that I disagree with many teachers, who say that the child should be taught nothing at home before commencing school. I have even taught primary work, but I have observed that those children who have learned something at home get along much faster and better in the primary room than those who have not. In many cases they save a year or more of time. I fail to see how the teaching they have received at home interferes with their work in school. If at home you give your child some lessons in reading and spelling, and have taught some number work, he is not, when he comes to school, confronted with two studies which are entirely new to him. He sees his reading lesson and he says, "Why, that's easy! Mother taught me that." It's the same way with number work. He has received a start at home and does not consider this work drudgery. The child who has received no home instruction sees the same letters on the board, but they mean nothing to him; neither do figures or numbers. He says, "I don't know anything about this, I can't do it, I want to go home." He never feels that he is master of his work, as the first boy does, and he will not like school as well as the first boy. Therefore, I think that you can save your boy or girl a year at school by means of a little home instruction in reading, spelling, and number work. By the last I do not mean counting, but simple little addition and subtraction problems. I must, however, warn you that if you teach your child the names of the letters, you must go further and teach him to do easy reading. If you do not, the phonic method, now used in schools, will confuse him, because by it the sounds of the letters are first taught.

One of the most vexed questions, and one most discussed among teachers is the matter of homework. This is one of the questions regarding which you may think one thing, but you have to act differently. I don't think that there should be any homework in the public school, but public opinion demands it. Parents—at least most parents—think that their children are not working unless they have homework to do, and so we must give them homework, but if children worked in school as they should there would be no need of homework. However, if your children have homework, see that they do it. Be interested in it, and know what they are doing, but don't do their work for them. If you do that you are doing the children a great injury. Try to find out whether they understand what they are doing, and see that they work while they work. Many children say that they have worked at their homework for an hour, when part of that time was spent watching the cat, thinking of a hockey game, or listening to the conversation of the household, and about ten minutes was really spent in working.

In high school work the matter is different. High school students need to work at home, and it should not be necessary to assign work to them. They should be sufficiently interested to work for themselves, without any supervision by their parents, but alas! they are not, and they will some day wonder how they could have been so foolish. Parents should know enough about this work to know when they are slighting it; to know the difference between "trying" problems and solving them. High school students should be working for themselves with a definite aim before them, and should work independently of teacher or parents.

Since the parents and teacher are working conscientiously toward the same end, the most cordial relations should exist between them. The parents want their children educated, the teacher is trying to educate them, so why should there be any strife between them? Misunderstanding there may be, but there is always an easy way to remove them.

First, then, you should be acquainted with the teacher. If you are, you know what kind of man he is, and you know what to expect of him: you will be able to see his purposes in the stories the children tell you of him. Some people have the idea that the teacher is a kind of "Philistine who walks fast, talks with a loud voice, and carries a big stick;" that he is always desirous of showing his authority, and just dotes on punishing their children on every possible occasion. If they were acquainted with the teacher they would learn that he is no bloodthirsty ruffian, but quite an ordinary individual, who doesn't wish to exercise his authority unnecessarily, and who would far rather not punish any children at all if he can possibly avoid it.

If any misunderstanding arises between you and the teacher, don't write him a note about it. It is wonderful how antagonistic a mild statement may look on paper; hence a note is likely to make the misunderstanding more serious, because the effect of the note depends on the way in which it is read. Either go to the teacher or have him come to you, and talk the matter over calmly and quietly. Such a course is conducive to mutual self-respect, and the difficulty seems very small when talked over. In this connection I would like to warn you not to take seriously all the stories that children bring home. Most children are not intentionally untruthful, but their imagination is very powerful, and to this imagination the temptation to make stories sensational is well nigh irresistible. Again, the child's viewpoint is different from the teacher's, and his story may thus be quite out of harmony with the teacher's explanation.

If you wish your child to succeed in school, you must try to make him enjoy attending school. To do this, you must encourage him in every possible way. Don't disparage the teacher before your children. You may think that the teacher is not doing his duty, but don't tell your children that; keep it for the persons to whom it should be told. If you tell your children that the teacher is incompentent, they will do their best not to learn anything under his teaching. Speak pleasantly of school and school life, and don't on any consideration give them any idea which will tend to make them think that there is any drudgery in it.

There is not sufficient attention paid, even by those parents, who are most careful of their children's welfare, to the matter of the reading, which comes into the child's hands. To become a good English scholar, the child must read good English works, and the parents must select the books which the child reads. Have him read books from which he will learn something, not fables with morals tacked to the end; not trashy, sensational bandit yarns, but good, healthy fiction, biographies or simple scientific works. If you inculate in your child a taste for the proper kind of reading, you provide him with an asset which will always be of inestimable value to him.

I shall not say much here regarding the child's physical education, because most parents endeavor to see to it that the child has a healthy body. The need for proper bodily exercise is too well recognized by parents to require special emphasis. Besides, the child's natural instincts lead him to seek that exercise which his body needs. Everyone knows that physical education is as essential as intellectual education; that a boy or girl has as much need of a strong body as of a trained mind.

There is one subject which I almost hesitate to mention, because I feel that in doing so I am going somewhat out of my sphere, but yet it properly belongs to this subject. If the parents in our village were doing their duty as parents, we should not have the boys running the streets at night. When on the streets these boys are in an atmosphere entirely foreign to that of the school and the home and are unlearning the lessons which the teacher or the parents endeavor to teach them. They are learning more bad habits than you have any conception of. I fail to see why so many parents allow their children to be out after tea. That is the time when the boys and girls should be getting their experience of home life. What is more beneficial to the child than to be with father and mother, brothers and sisters around the fireside when the day's work is over? What an opportunity for the parents to impart, by story, by suggestion, by precept, or by example, the true and nobler lessons of the higher life! Then use these precious hours between tea and bedtime to the best advantage and don't undo the work of the school and that of the home by allowing your boy to be exposed to the contaminating influence of the street.

In conclusion let us observe:—

(1) That education is not filling the mind with mere knowledge, but is the development of a healthy character.

(2) That the function of the home in education is more important than that of the school, and that the former cannot, and should not, transfer any of its responsibilities to the latter.

(3) That the parent and the teacher must co-operate fully in working toward the goal which each has in view—namely, the making of a good citizen.

(4) That the future of our country depends upon her citizens, and that the kind of citizens is determined by the home.

SAVING STEPS.

By Mrs. Whealy, Thornton.

(Read before the South Simcoe Institute).

It is wealth to the man whose wife's steps are made few and when everything about the house is as convenient as possible, saving her health that she may be the helpmate of her husband. It seems to me the one thing necessary with all workers, and especially with farmers' wives, is to keep above the thought of drudgery. To look beyond the toiling to the results, and so transform drudgery, which no one enjoys, into work; and when work becomes spontaneous it is no longer under the law of necessity, but is joyful and free from strain. In many farm houses there is little thought given to the steps the housewife and mother takes, as farmers too often fail to give due consideration to the necessity for improved kitchen furnishings, while they have all the late improvements to make their own work easy and save steps. Men can help a great deal to save steps. They can lighten our work by encouraging us.

We can get into bad habits making needless trips from room to room while in good health, when we feel it not particularly worth while to save steps. These cost us dearly, however, when at last infirmities come upon

us, as they are sure to do sooner or later. A great deal more work can be accomplished by forethought. A certain lady on waking in the morning, and before rising, plans the work of the day, studying how to save steps; and thus she finds that if she goes about her work thoughtlessly, she unnecessarily travels over the same ground several times. If we are orderly, having a place for everything and keeping things in their place a great deal of uncalled for labor is saved. The interior arrangements of houses and the placing of utensils make a great deal of difference in the number of steps taken. Articles not often used should be kept in the farthest corner of the room and give place to those which are constantly in use. How convenient for the housewife in place of going to the well for water, to turn a tap in her kitchen and get all the water needed.

If the water be brought to the barn by the wind-mill, why not be brought into the house? Perhaps she has to convey the waste water to an outside door, down a flight of steps to a safe distance from the house where it is thrown upon the ground, when a sink with a waste pipe might be constructed in the kitchen, thus saving many steps and much hard lifting. If the sink and table be high, much stooping will be avoided. A tall stool adds much to the housekeepers comfort, and one can be improvised by cutting the top off a child's high chair. She can sit upon it when compounding bread and cake and other foods, also washing and wiping dishes and cleaning vegetables. A drop shelf is convenient and saves room. It can be attached to the wall by hinges and a prop fastened to the shelf by another hinge, this prop then falls into place easily and the shelf is against the wall when not in use. A dumb-waiter saves much travelling up and down stairs, but we who are not so fortunate as to possess one can stop and think how many things are needed before going to and from the cellar, and thus save our time and strength.

When we are cleaning away the remains of one meal we can decide what is to be had for the next, and if there is anything in the pantry or cellar which will require time for preparation, bring it back with us when we go there with what is left from last meal. Before beginning to prepare a meal it is wise to stop and think how many things are needed from the cellar and bring as many as possible at a time and not travel the twelve to fifteen steps as many times as there are articles required. It is a good plan to use a tray in carrying things to and from the cellar. When the remains of one meal are removed from the tray, what is needed for the next meal can be placed upon it. Another lady saves steps by putting all refuse into a pail at the end of the table. The pail is kept clean by means of a newspaper placed in it before it is used. She keeps three dredging-boxes on the table, containing suet, sugar and flour, which are often in demand. Mrs. A. has a cupboard half way down her cellar stairs in which to put provisions and two or three shelves on the side that can be reached by just opening the door. These hold many things conveniently.

The house is the centre of the universe. Woman is the centre of home; civilization, therefore, is dependent upon her health and her stimulating influence. All household improvements which can be provided to conserve her strength will add to her power and efficiency.

HOW TO KEEP COOL.

By Dr. G. B. Snyder, Ridgeway.

(Read before the Ridgeway branch of the Welland Institute).

Many people throw open their houses in hot weather to let the air through. If the air is hot outside this does not cool but only heats up the air in the house, which becomes exactly the same temperature as the air outside. Close up your doors and windows during the sunny and hot part of the day and your house remains cooler inside—about the same temperature as the cool outside night air. The house must be aired, but this can be done during the night. About sundown when the dew begins to fall, the dust to settle and the air to cool, open up your doors and windows—keep them open all night and until the early morning, closing them again before the dust begins to rise and before the air becomes hot. In this way your house is cooled and ventilated and the dust kept out. The rooms are filled with cool air that remains cool all day.

Do all your cooking in your back kitchen or shed. This can be done in a small place by using a hot plate when you have a gas or oil stove. When gas is not used then take care to keep all doors closed between the back kitchen and the other parts of the house, but open up doors and windows of the cook-house so that the air can circulate through it and carry away the extra heat of that room.

At night keep very few lights about the house, and those necessary turn as low as possible. Many people heat their houses to an unbearable temperature by using many lights and turning them high. When you are already warm very little heat is required to raise the temperature one or two degrees which makes a great difference. During the night, turn all lights out, but if a very dim light is necessary use one that does not produce much heat, as the "Glory Night Light," made by filling a glass tumbler $\frac{2}{3}$ full of water, pouring on a little olive oil and placing on the oil a float with a short wick $\frac{1}{2}$ inch long and the light will burn all night without danger of explosion or fire, giving plenty of light to see baby by and to scare off burglars. Only a minimum heat is produced.

Do not go into your cellar or into your ice-house to keep cool. It is as dangerous as to crawl into a hot oven to get warm. The sudden change from high temperature, from perspiring skin and open pores to a low temperature and dampness of cellar or ice-house will chill at once and may cause colds, rheumatism and prepare the way for many sicknesses.

Dress properly to keep cool. As the weather gets warmer let the weight of clothing be lightened. Perform this gradually and not too soon. Lighten from the outside in, not from the inside out as many do very foolishly on the first hot days of spring and suffer with pneumonia afterwards. Commence by reducing weight of outside coats, and on cold days or driving put them on again. Then as the weather gets steadily warmer, change to a spring suit and last of all change from winter to summer underwear. This should not be done until the first of June and even not then unless weather is settled, steady and warm. Change the outer clothing from woollen to cotton or linen, but never leave off woollen underwear. Get the softest, thinnest, and finest you can. It is not hotter and if fine, does not cause itching, being at the same time a poor conductor of heat, while cotton is a good conductor of heat. Woollen, being a poor heat conductor, prevents sudden chilling of the body and therefore prevents muscular rheumatism, colds, bronchitis. Dress to keep as cool as possible without endangering the health.

During the hot weather it is a wise precaution to carry a light jacket or shawl for protection of shoulders and chest while out in the cool evenings or cool winds or driving.

The feet may be kept cool by wearing light cashmere stockings (never cotton), and low shoes—leather or canvas (never rubber) or open sandals.

The greatest care is required in the protection of the chest. There is more danger in exposing the chest than any other part of the body, and still many ladies uncover the whole upper portion of the chest, the vital part that contains the bronchial tubes, the close entrance to the lungs and go about in cold air, cold winds, driving, etc., regardless of the foundation they may be laying for acute and chronic diseases. On occasions when fashion calls for low neck dresses *be very judicious*, uncovering only where the air is of suitable temperature to prevent taking cold.

Drink to keep Cool.—Sometimes when you feel distressed with heat and have a thirst that nothing seems to satisfy, a dish of good ice cream will touch the spot at once and make you feel fresh and keen again. Ice cream should be eaten slowly. If eaten too fast it chills the stomach and will sometimes cause a very severe sympathetic headache. Ice cream should not be eaten in too large quantities, for it may cause acute indigestion. Neither should it be eaten after long standing or re-freezing for fear of toxines having been formed in it. Other good cooling drinks are lemonade, which should not be taken near the same time with milk on account of curdling the milk. Then we have buttermilk, oat-meal water, cold water and ice water.

Diet for Hot Weather.—The Esquimeau eats fats and drinks oil. Living in a cold climate he requires food which will produce heat enough to keep him warm. In hot climates and in our hot weather, fats, meats and oils do not suit our taste nor agree with our health; though in cold weather we can stand a fair amount of both. In hot weather very little heat is required and I maintain that considerable less food of all kinds is required than in cold weather. In winter, food is required to produce our muscular exercise and to keep us warm; in summer, food is required only to produce muscular exercise and nothing or little for heat, therefore much less is required and that of a considerably different nature.

The diet requires to be such as is easily digested,—milk, fowl, fish, fruits, vegetables, etc. Nature seems to provide what man requires in any particular latitude at any particular season of the year. In the summer our stomachs long for the cool fresh crisp vegetables and in the winter for meats, etc.

How to Sleep to keep Cool.—If you are troubled to get to sleep and to sleep well in hot weather, observe the following suggestions: Lighten the bed clothing, change from woollen to cotton and in hot weather a single cotton sheet is sufficient, but do not do as I have heard of some people, lie entirely uncovered, or get out of bed and lie on the floor beneath the window to get the cool draught from the window, for if you do you may wake up with a stiff neck or back and wonder why you are in such poor health. To keep cool let your rooms be well aired during the night, but take great care not to let a draft reach the body. If you are warm and perspiring and a cool draught blows on an exposed part and cools it quickly, cold in that part is sure to follow, as sore throat, toothache or earache. Many children get earache in this way on account of their mothers' carelessness. The rooms up stairs are much hotter than those down stairs to sleep in, because the hot sun striking on the roof all day gets the rooms beneath the roof very warm.

Sleeping on the verandah is cool and pleasant. There you have the advantage of the cool fresh night air without any hot walls about, and very little danger of catching cold, if well covered, as the air is all about you and not blowing on one spot while the rest of the body is hot and perspiring.

Bathe to keep Cool.—Sometimes in the extreme heat you feel hot and the body and feet fairly burn. Nothing seems to relieve you. Possibly a bath with tepid or cold water, if you like it, would relieve the burning and freshen you again. If cold water is not pleasant, take warm water and bathe well, and when through rub with pure alcohol. Pour a little in the hand and rub over the body with the palm of the hand. Alcohol evaporates rapidly and cools the skin and makes you feel fresh and fine again. Often after such an operation you will drop to sleep and sleep well.

It is a good plan to bathe the feet in cold water every night before going to bed. The feet get dusty in hot boots. The bath freshens and relieves them for the night and for the day also.

In conclusion, let me add the following few hints:—Do not remain idle all day to keep cool; neither work too hard to over-heat yourself. Work, but work with judgment. While working you have not time to think and worry so much about the heat, and imagination counts for a great deal in this world. Also keep your nerves composed. Do not get excited, and control your temper, for any of these let loose will heat you more than the hot sun. Finally, keep your general health in normal condition,—appetite, stomach, bowels, kidneys, etc., in a healthy state, for if in good health, you will not mind the heat so much.

WHAT TO DO, AND WHAT NOT TO DO, WHEN A GUEST.

By Mrs. E. Cober, Moorefield.

(*Read before the Moorefield branch of the West Wellington Institute*).

Hospitality is a most comprehensive term. It means not only the glad sharing of one's best with kindred spirits,—it means to give cheerfully of the privileges of the home to passing guests, and to give the cup of cold water to the weary wayfarer, with as sweet a grace as to the more fortunate.

In olden days, the term meant in its application, more in quantity than it now does, but the quality of the genuine article is to-day, as it was then, close akin to that of mercy in that it is not strained, and is twice blessed, blessing him who gives as well as him who receives.

It is often difficult to tell whether the guest is there by an affectionate desire for the hostess or by the fact that the summer is long and hot, and city folks like to get to the country where it is cool and pleasant.

Whichever the case may be there is, or ought to be, some tie of friendship or love, to warrant the familiarity. We should never go without an invitation, unless we have a standing invitation, even then we should not go without first giving warning. The postal rates are now so reasonable that one cannot excuse negligence on that score. It is only selfishness or laziness on the part of the prospective guest, and surely the hostess has a right to know when visitors (whose presence means a certain disarrangement of the household) are to be expected, and how long they intend to remain.

Keep your engagement if possible. If you have made an engagement, the hostess is expecting you, so do not allow any trifling matter to prevent you.

Another annoyance is to have meals delayed by the guest. In a busy household this is often serious, and, no matter how entertaining a guest may be, men always like to have their meals sharp on time.

When we go on a visit we should have plenty of toilet articles on hand, such as needles, thread, pins, comb, brushes, towels, etc., so that we will not need to borrow from our hostess, as is often the case.

We should attend to our own room, and keep things tidy, and not have our things lying here and there to be picked up by the hostess. We should not rise hours before breakfast time, and get in the way of the cook, or servant, or, if the hostess has no servant, hinder her in her work, as is often done. If we cannot help her by doing some of the work, it is better to leave her alone. The rooms below are often put in order for the day before guests or family are astir. Whereas, if the guests were up we would simply say they were in the way.

We should not pass remarks on the food which is set before us. If there is anything that does not suit our taste we should be careful not to hurt the feelings of our hostess, nor should we ask for anything that is not on the table. We should not be selfish about drives, walks and other pleasures.

City life is so different from country life, that perhaps a few words of advice will not come amiss. We should not ask our hostess to meet us at the train, unless we can specify, to a certainty, what train we will be on, and what time we will arrive, as there are so many trains and routes by which we can travel and it is a disappointment to go to meet a friend, and miss her.

We should have plenty of loose change in our pockets for street car fare, and other things, at almost every turn we take. There are so many calls for money in the city, and although our hostess may want to pay, it may be that she is not in a position to afford it. This is, of course, meant for people in the ordinary stations of life, not for those who revel in wealth.

We should dress according to our means and station in life. Dress neatly and plain, select suitable materials, avoiding anything flashy. We can dress tastefully and neatly without frills and lace, and enjoy ourselves a great deal better than if we were dressed in more costly apparel.

Do not be afraid to look at things in the shop windows for fear people may think you are from the country. The things are put there to be seen, and the city man or woman looks to his or her own content. You may do the same with freedom, no one will criticize you, nor remember you even for an hour.

Whole chapters have been written on the duties of the hostess, but it is well to remember that duties and obligations rest with the guest as well.

The best rules of hospitality, like those of every other phase of polite association, are based upon common sense, and the golden rule, and all its problems may be settled in accordance with them.

INSECT PESTS.

By Miss Sara Ford, Logierait, Ont.

(Read before a branch of the East Lambton Institute.)

Entomology, the study of insect life, is very interesting to the student of nature. Insects are different in many ways from other living creatures. They do not grow by increase in size as a bird or a cat does. All insects

undergo a series of transformations which constitute their life history. First the egg-shape, then the larval form (whether worm, caterpillar, grub, or maggot) then the pupal or chrysalis state, and finally the perfect insect, either butterfly, beetle or fly, according to the order to which it belongs.

One or two points are to be noted here; one is that it is chiefly in the larval form that the insect is injurious. At that stage the insect is simply a stomach, insatiate, greedy, and will actually eat two or three times its own weight in twenty-four hours. In the third stage it is usually dormant, and harmless, frequently passing the winter in a cocoon which it has spun for the purpose. In the adult stage the butterfly or beetle does little or no harm. Their mission is to lay eggs, and they eat very little. Flies, however, are injurious in this stage. It is extremely important to know something of these changes because while the insect is harmless at one stage, it may be very destructive at another, and its appearance is so different that recognition is impossible unless one knows the life history. The successful house-keeper must be a close observer and a careful student in order to keep her house free from noxious insects.

Some insects which give us trouble are the Buffalo Carpet Beetle, the Clothes Moth, the Meat Fly, the Cheese Fly, and the Ant.

The Buffalo Carpet Beetle was imported from Europe about 1874, and was first noticed in the city of Buffalo. The perfect insect has wings, and is marked with an irregular red stripe down its back. It is covered with small scales, which give it a somewhat mottled appearance. Like the potato beetle, it feigns death when disturbed. This beetle lives upon flowering plants, and is frequently found on the yarrow and on the cherry tree. It flies through the window or door in May and lays its eggs in woollen material, or under the edges of the carpet, then flies out again. These eggs hatch into the grub that does the damage. They are about one-fourth of an inch long and are covered with coarse brown hair. They are found feeding upon the woollen substance in the cracks of the floor, and in the carpet itself. When once in a carpet it is a very difficult insect to destroy.

This grub does not spin a cocoon as the caterpillar does, but its skin becomes thick, forming a sort of case. The larva changes into the pupa, and passes the winter in that stage, the beetle or perfect insect emerging in the spring.

Many house-keepers have been content to adopt vigorous methods at the wrong time, that is when the young grubs, which have been hatched from the eggs of the pretty beetles, are damaging the carpets. With very little trouble the beetle may be prevented from entering the house by the timely use of window screens.

Remedies:—(1) Where carpets are infected they should be taken up, well beaten and sprayed with benzene. If exposed for a few hours the smell of the benzene will pass off. The floors from which the carpets have been removed should be mopped with scalding water, and benzene sprinkled in the cracks of the floor.

(2) Damping the carpet on the floor and running a hot iron over it at the points infested will prove very beneficial.

One of the greatest enemies of the house-wife is the clothes-moth. It is very small and makes its way through the smallest crevices. The female finds her way in early summer among clothes and furs, which make suitable food for her young, and there deposits fifty or more eggs. In about a week the eggs hatch, and the young grubs begin to eat the material upon which the eggs are laid; after a time it spins a case for itself. As the weather becomes warmer the little grub closes this case, and in three weeks the per-

feet moth will make its appearance. To prevent these moths, air the winter clothing occasionally during the summer. Cedar placed among the clothing is a good preventive. A cedar closet has been found a place of safety for furs, etc. Camphor is a good preventive, but takes the color out of sealskin, and should not be used for that fur.

Another pest is the meat-fly, blow-fly, or blue-bottle, which lays its eggs in meat. It is difficult to cover meat so that it will be safe from this fly, as it can drop its eggs through the meshes of a net or screen. The grub soon hatches, and goes to work. Like many other insects the pupa or chrysalis of the meat-fly is dormant during the winter and in the spring the blue-bottle bursts from its shell ready for the summer's work.

The cheese-fly, the mother of the cheese-mite, is much smaller than the common house-fly. She has a little black body, and whitish wings with a black edge. The mother fly, flies in the cheese room at the factory, finds the cheese and into cracks in the cheese she pops about 100 eggs. In a few days these eggs hatch, and then the little mites have a big dinner party, followed, we might say, by a lively dance, when the cheese is cut, giving them a chance.

These, like the other insects change to the chrysalis form, which in time becomes a fly. Screens are the best safe-guard against these flies.

Ants are very interesting insects. They live in communities, regulated by definite laws, each member having a part in the work of the colony. Each community consists of males, females larger than the males, and workers. The workers have no wings, and the males and females only acquire wings for their wedding tour, (corresponding to the flight of the queen bee and the drones) in the autumn, when they may be seen hovering in the air. After this the males perish, and the females, who escape the birds, found new colonies, laying eggs and raising a new family. Her wings are soon lost. Many or all of the females die in the fall, the workers remain dormant during the winter, and are ready to take care of the larva in the spring. They also take care of them in the pupal state, until they become the perfect insect.

If these little creatures would build their cities at a greater distance from our dwellings, we should not feel like molesting them. Unfortunately for them they come too near, and we have to banish them. We may do this by seeing that no decayed wood is near our dwellings, and by seeking out the anthills and sprinkling them with benzene, or pouring hot water on them.

It is unnecessary to state that mosquitoes are interesting for more reasons than the purely scientific. Perhaps no other insect is so well known throughout the wide world. It tortures the Esquimaux in the far north, as well as the African in the torrid zone. No country seems to be free from it. The best time to study the mosquito is in the summer when the wrigglers are abundant in stagnant water. The female lays from two hundred to three hundred spindle-shaped eggs on the surface of the water. These eggs remain glued together, and float about like a tiny raft. They hatch in about 24 hours. In nine or ten days the wrigglers take another shape, the pupa, but unlike that of other insects the pupa of the mosquito is very active. In two or three days the pupa case splits along the back, and the insect gradually raises itself on its long spindly legs, using the old pupa skin as a raft. The male mosquito neither sings nor bites. He lives on the juice of plants.

Dr. Howard of Washington, gives three methods of ridding a locality of mosquitoes. These are:—(1) By the drainage of the swamps and pools in which the mosquitoes breed. (2) By the use of kerosene on the surface of

the water (an ounce to 15 sq. ft. of surface). (3) By the introduction of fish into ponds, to eat the wrigglers.

Before closing we may note the house-fly. In early spring we notice a few and wonder where they come from. These have found hiding places in the fall, and when the warm days come, they awake from their winter sleep. These will lay eggs in decayed matter, which in a very short time will hatch into maggots. These in turn change to the pupa state and then to the perfect insect. There are many different classes of flies. A little fly does not grow to be a big fly, it simply belongs to another class.

The house-fly has risen in public recognition from a merely troublesome pest into the eminence of a possibly dangerous foe. It has been found that it is capable of conveying the germs of disease from the sick-chamber to the kitchen or dining-room.

Flies, like other insects come from *without*, and pains should be taken to keep them without. This may be done by destroying the few flies we find in the spring, and by using screens to prevent the entrance of others. The screens should be put in the windows early in the spring, as "an ounce of preventive is worth a pound of cure."

BEE-KEEPING AS AN OCCUPATION FOR WOMEN.

By Miss M. Treverrow, Meadowvale.

As a rule, to the woman who has had no practical experience with bees, if she thinks of the subject at all, bee-keeping stands for honey, large profits, studies in natural history, and stings, the latter being probably considered the surest and most objectionable adjunct of the business. But a few years acquaintance with the little pets will teach her that stings are but insignificant incidents in the bee-keeper's life, that honey is not always sure, nor profits always large, but the study of the nature and habits of the bee can be depended upon at all seasons of the year to yield a fund of interest to any woman who engages in this occupation.

The story of my experience with bees is probably my best means of showing what bee-keeping may be as an occupation for women.

I started bee-keeping in 1900 with one colony, for which I had paid $5. They did not swarm or give any surplus honey during the summer, were weak in the following spring, and gradually dwindled away until the hive was empty. I purchased another colony for $6, in May of 1901. When they swarmed I divided the bees and brood in the old brood chamber, putting half into a new hive and altering each with frames of foundation. From the next swarm I received 30 lbs. of surplus honey. For the spring of 1902 I had three colonies, which had given me so little trouble that I thought I could manage a couple more. I purchased two more strong colonies for $15. When they started to cast out first, second, third and fourth swarms I began to have some idea of what bee-keeping was, having double brood chambers in 8 frame Langstroth hives. The swarms were large and when two swarms issued at the same time I had enough to do to lift the double hives away and replace with new ones before the bees began to return, the queens being clipped. I had heard of twenty swarms issuing at the same time in large yards, but two at once were enough for me at that time.

Those five colonies gave 928 lbs. of extracted honey and increased to sixteen. At the end of the next season (1903) I had thirty-five colonies and 1,400 lbs. of honey from them. In the spring of 1904 I had thirty colonies,

five having died in the cellar; they yielded about 2,600 lbs. In the spring of 1905, I had thirty-three colonies when the weak ones were united with the strong ones; they stored 4,700 lbs. of honey and increased to forty-nine. Last spring (1906) the numbers decreased to forty, five being queenless and four too weak to go alone. They yielded 1,600 lbs. of honey, and formed thirty-nine colonies by fall.

As to stings, my first serious experience with them nearly put me out of the business. It was when I had only five colonies. They seemed to be trying to make a record of 200 lbs. per colony for that season, and when I attempted to take the honey off, they resented my interference with such vigor, that I left the hive open and ran to the house saying when I got there, "There is no use talking about getting used to stings; I will never be able to stand such punishment as this, it is too much for me." But I did not like to be beaten by the little bees, so I fortified myself against another attack by covering my hands and wrists with long, heavy gloves, and succeeded in taking the honey off. Ever since that I have worn gloves in handling my bees. Even when clipping queens I use gloves with the finger tips cut off. I know that the wearing of gloves is not looked upon with favor by the professional bee-keepers, but when it comes to the question of gloves or defeat—wear gloves.

There are other things connected with the occupation, that are not very agreeable, the stickiness of the honey in uncapping, extracting, weighing, and pouring into cans, which has won for the male bee-keeper the title of "Lick Thumbs," is one of the mildest miseries, so easily reduced to insignificance by the use of water, as to be scarcely worth mentioning: only, we are treating of bee-keeping as an occupation for women, and she who takes it up is sure to find that this trying feature certainly belongs to it.

She may expect too, considerable hard work and heavy lifting for in handling 8-frame Langstroth, one of the smallest hives, there are many 60 lb. lifts, and if she be incapable of lifting that amount, a woman is likely to be handicapped by her inability to move or carry a full hive or super, or a 60 lb. tin of honey. It is well enough to depend upon outside help for big days when carrying in supers of honey for extracting, or in weighing it and crating for shipment or conveying the bees to their winter quarters, but for the common every-day work of the apiary which requires much muscular exertion, the woman who aims to become an efficient bee-keeper cannot afford to depend too much upon outside help.

Bee-keeping may be looked upon as a healthy occupation for women in comparison with many of the avocations to which she is called, wherein exercise, fresh air and sunshine are denied her. It is true, there will be times when the humidity of the air and the intense heat of the sun, aggravated by the exercise she is forced to take through excessive activity of the bees consequent upon these weather conditions, may lead her to exclaim, "Why was I ever born to be melted like this?" But these conditions usually only last for a few hours in a day, and not very frequently through the season, and there are so many rare, beautiful days to enjoy during the honey harvest, that one forgets the discomforts of a few hot, damp, wilty hours, in the pleasure of those when air and sun and bees combine to make the bee-keeper's life worth living.

One very important part of the business is the melting of old combs. It is hard, sticky work to cut wired combs out of the frames and put them into the extractor. It is difficult for a woman to lift the lid handle, screw and press off the extractor, without getting upon a chair, even though she is strong and tall, and this has to be done every time the extractor is filled

with combs. The heat, steam, and the odor of the hot wax, pollen, etc., make this one of the most objectionable features of bee-keeping; but as the house-cleaning with its dust, disorder, and discomfort, while in progress, proves such a delight to the house-keeper in its results, so comb melting amply repays the bee-keeper by the improved sanitary condition of the hives: and from what we learn from conversations with experienced bee-keepers in bee journals and deductions from papers read at conventions on the subject of healthy disease proof colonies, the renewal with clean new foundation in the hive forms a very important factor in insuring healthy conditions in the apiary.

And the possibility is that, if woman with her natural house-cleaning proclivities should invade the realm of bee-keeping, this branch of the business would be well attended to, and the problem of foul brood solved without any formula.

There are many things in connection with bee-keeping that a woman can work at with genuine pleasure. Take that of opening up a few crates of bee supplies, and transforming the neatly made and precisely fitted pieces into hive bodies, bottom boards, and cover, frames with top, bottom and sides of white, clean wood that fit each other like a charm and fit the hives just as perfectly. Then there are the folding of the sections, the wiring of frames, and embedding wire in foundation, etc., all neat, clean, fascinating features of the business.

My advice to the woman who wishes to take up this work would be, spend a season with an experienced bee-keeper if she has the opportunity, paying strict attention to every detail of the work. She would gain thereby much knowledge that, if won by her own experience, would cost her dearly. An instance in point of this; I had been told to put an empty super under a large swarm to give them room to cluster and prevent them from swarming out again. I only grasped the one idea, put the super under, and, I did not note that it should be taken away at a given time. The consequence was that a colony did not make as much honey in the supers, and in the fall when I strove to take out what I thought was an empty hive, I found a peck or perhaps a half bushel of trouble accumulated there in the shape of combs built towards all the points of the compass, young brood in all stages, hundred of bees crushed between combs that had fallen when the hive was lifted off, and a possibility that the queen was killed in the general mix up. To have seen this done properly would have saved time and expense.

In conclusion this record shows that a woman may expect the little busy bee to gather honey for her at the average yearly rate of 61 lbs. to the colony; that stings may be subject to her will; stickiness also; that hard work, heavy lifting, perspiration, and disagreeable odors must be borne with fortitude; that careful attention to detail is imperative; and that there are many things in bee-keeping that are calculated to make it an attractive, enjoyable, and also a profitable occupation for women.

THE CARE OF FLOWERS.

(Read before the Ballindfad branch of the Halton Institute).

The Palm.—One of the good qualities about the palm is that it will withstand more adverse conditions than any other plant, such as alternate heat and cold, hot dry air if not too long continued, and rough handling of the leaves, all of which house plants are sure to get in the average home.

They must have a rich peaty soil, using cow manure only. Soil without lime is best, as they never get it in their habitat. They can be fed bone meal during the summer to stimulate their growth of leaf, but they should never be forced in winter, nor be set in the direct sunlight longer than a few hours at a time, as all palms while young are apt to be more or less slow growers. For immediate effect it would be best to start with one in a 6 in. pot in November.

The Fern.—The fern is a lover of shade and moisture, although it will do well in partial shade if the atmosphere is moist. In order to get an immediate effect, procure those which have been shifted into 6 in. pots in the fall, as the fern is a slow grower. If a very large maidenhair is desired for a special purpose it should be gotten in a 6 in. pot or pan. The fern should have a peaty or woody soil, that in which a clump of wild ferns is growing would be an ideal one, but where this cannot be had, the soil can be made by using one-half good garden soil, one-fourth leaf mould and one-fourth sand: to this add one-fourth of its bulk in some kind of humus, decayed wood, chopped straw or any similar vegetable matter. Never set a fern in the direct sunlight behind glass, as in a sunny window it is liable to scald. During the summer put the ferns out in the garden in a moist, shady place, but watch for the first frost, as they are very tender.

The Cactus.—The Christmas Cactus requires to be partially rested during the summer months, by standing the plant out of doors on the north side of the fence or building, or any place where not exposed quite fully to the mid-day sun, during July and August, and giving it only a moderate supply of water, sufficient to keep the soil barely moist. Stand the pot on a board or on level ashes to keep garden worms out of the pot. This latter method should be adopted with all pot plants, when put out of doors in summer.

The Begonia.—The thick-leaved varieties will do well in any house in which the air is kept pure and from which the frost can be excluded, and with no more care than is given to the geraniums. The main requisite is to give them a light, porous soil composed of loam, leaf mould and sand, with sufficient rough material at the bottom of the pot to insure good drainage. None of the Begonias care for much strong sunshine, although mild winter sunshine is beneficial. They require about as much water as geraniums.

Resting Plants.—Many people entirely disregard the fact that plants need rest, and keep on watering them, stimulating them to grow winter and summer, year in and year out, and then wonder why they do not thrive. To expect a plant that has already exhausted itself flowering to flourish under such treatment is about as reasonable as to expect men and women to keep on working and still be strong and healthy without sleep, so if you have still in your window a stunted looking hydrangea, summer flowering fuchsias, oleanders, or geraniums whose flowering period should naturally come in the summer, put them down in a cool, dark cellar as fast as you can, and proceed to let them almost do without water. They should have been under such treatment long ago, of course. Where plants bloom naturally during the winter, or have been trained for winter blooming, as geraniums and many other plants may be, there is a different matter to consider, but remember that all flowering plants need rest,—a good long rest of two or three months or more at some period of the year. If not rested during the summer they may be in the winter, or they will never do as well as they should. Where a plant has finished flowering and its leaves show a tendency to ripen off, you may take it for granted that it is simply asking for its time

of repose. Never mind if all the leaves drop off, that is what they are likely to do. They will make more or less vigorous growth in the spring because of it. Among the plants which should be set away the sooner the better, is the chrysanthemum. Leave it down cellar until the end of March, then bring it up, cut off the old stalks and either divide the roots the easiest way or make cuttings from the young shoots for winter flowering plants. Of course the calla requires resting in summer, but in every case the ripening of the leaves may be taken as index of the treatment.

THE CULTIVATION OF FLOWERS.

By Mrs. Jos. King, Randolph.

(Read before the Lafontaine branch of the Centre Simcoe Institute.)

Women have begun to understand that health as well as happiness follows the footsteps of outdoor work. With pure air for the lungs, and healthy fatigue in the muscles, come good digestion and sound sleep. In no way can we have such pleasant exercise as in the cultivation of flowers. It it simply wonderful what a little care will do, and how quickly our mute and beautiful friends respond to kindness. This is the month of preparation; by getting the beds dug, well enriched and finely pulverized. Make your rows, packing the soil firmly where the seeds are to be sown. As soon as the weather is warm enough, sow such seeds as asters, candytuft, canterbury bells, daisies, pinks, portulaca, pansies, petunias, phlox, verbena, marigold, zinnias and last, but not least, mignonette. The latter is one of the most fragrant plants we have. It is one of the plants anyone can grow; it is not particular as to soil and treatment. Provided weeds are kept from crowding it, masses of it make the air sweet for a long distance after a summer shower or early morning; a spike or two will fill a room with sweetness. Though not at all showy it is really beautiful when we come to examine it carefully.

The sweet pea is another one of our most popular flowers; everybody wants them, and no one need fail in growing this sweet flower, if she will only observe and furnish its few requirements. These may be briefly summed in early planting, a deep cool soil, properly enriched with well decayed fertilizer, plenty of sunshine and a good sized trellis. If planted deep and early in a soil having a suitable admixture of clay, the sweet pea will ask but little aside from the daily cutting of its flowers. A safe rule in sowing seed is to cover deep in proportion to size and weight. Large coarse seed should be covered much deeper than fine seed; very fine seed should be covered very lightly, press the soil down upon the seeds evenly.

A clay loam made very rich seems to suit dahlias best. They are great drinkers and unless generously supplied with water will not perfect their bloom; it is best to plant where they can be protected from strong winds. Stocks should be set where the tubers are planted to which the plants can be tied as they grow. The gladiolus is another of our favorite flowers that requires but little care after planting in a warm rich soil with plenty of sunshine.

A great many of us do not as a rule have enough cut flowers in our houses. A great many raise flowers in their garden, but they are afraid to cut them; it seems a pity to destroy their bloom, but it is better for the plant

to cut off a reasonable number of flowers than to let them remain. A plant grows and blossoms to produce seed, and when this operation is finished it proceeds to rest and take life easy, if we cut one flower from it, every effort of the plant will be directed towards replacing it, and another will spring forth in a new place; the more flowers we cut the more the plants will produce, therefore cutting flowers stimulates and improves the plant and adds greatly to the display. The woman who says, I have no time to bother with flowers, generally makes a mistake and robs herself of the most lasting and inexpensive joys of life. Caring for our blooming pets is recreation if we love them. For some of us it is our only luxury, and who will say that we do not enjoy life more, hard work and all?

We should cultivate flowers if for no reason than the refining influence they have on our children, especially our boys. Perhaps nothing we can do for them will refine and keep their minds purer than the love of flowers. We never yet met the child that did not love flowers. The gift that has given me the most lasting pleasure was a basket of bulbs and roots sent by a dear friend, who believed that all this earth would be a flower garden some day. As the years have gone by we have added to them a few bulbs from one friend, a shrub from another, now our collections means mementoes of dear friends. One of our poets has compared flowers to God's smiles,—what a beautiful thought. I may say that I never yet went among flowers but I felt strengthened and comforted, so I truly think that God's blessing is with them.

Believe me, the nearer we live to flowers and other beautiful things in nature, the nearer we live to God.

COUNTY CONVENTIONS.

County Conventions, a brief mention of which is made in the introduction to this report, are a means by which the work in the different localities can be placed upon a better basis, and more uniformity established among the branches.

GREY COUNTY CONVENTION.

The convention held at Flesherton on September 17, 1907, was largely attended and proved of great interest and benefit to the representatives from the various branches. We give herewith one of the papers presented at that convention, and trust that other counties will take up the idea and arrange for similar gatherings. It was unanimously decided to hold a similar convention next year.

Address by Mrs. Jos. Davidson, Lake Charles.

Women's Institutes are the growth of a necessity, a necessity because of the women of America reaching after more knowledge regarding their special avocations. This craving after more knowledge manifested itself in different ways. Some women asked for a better and wider field of labor and remuneration, more nearly equal to that of man. Others asked for the franchise, but the majority did not trouble themselves about politics, being more in favor of higher secular education, begging and petitioning to be admitted into various colleges on equal footing with their brothers. The matter was freely discussed in the homes, and by and by articles on the subject began to appear in the newspapers.

It was about 37 or 38 years ago, when I first noticed an article on the higher education of women. It was on the front page of a Toronto weekly and written by a member of Parliament. The whole jist of his letter, which occupied nearly a column, went to show that the higher education of women could bring about no good, but would hinder them from being good wives and mothers, and tend to make them neglect their households. This article stayed with my memory all these years, because I thought it so unjust that a man could think that ignorance was the best stuff out of which to make good wives and mothers, or even good housekeepers.

But all this talking and writing did not stop the craving after knowledge, and presently the girls began to get a little beyond the 3 "R's," and here and there one a little bolder and more persevering than the rest made her way into the colleges. I remember the first woman doctor was hooted in the streets, and one would often hear regret expressed when a gifted and educated woman married, that her fine training and education would all be lost. There are still some left who believe this to-day. That this is only a fallacy born of ignorance is very evident, for it is to the better education of women of the past century that we are indebted for the marked advance in the civilization of to-day. Few, if any, ever get entirely away from the training and associations of childhood. So much of it hangs to us through all the vicissitudes of life. It is the practical women of to-day who are shaping the men and women of the next generation. This is a very responsible position, and, in order that she may fill this high position with credit to herself and her family, it is important that her education be of a very broad and liberal sort, far broader than that taught in our present college system, which is more suited to the requirements of men. When a boy reaches a certain age, he decides what is to be his life work, and accordingly goes to a college where his line of work is taught. If he is to be a minister, he goes to a theological college, if a doctor, to a medical college.

I am sorry to say that a great many of our girls do not do the same, even now when they have a chance. She usually makes up her mind that she will have a home of her own, some day and instead of going into training for it at the MacDonald or some other Institute of the kind, she goes into a factory, store or office. Presently she has a home of her own, but she is not prepared for it, and has thought little of what her duties will be. This is where the institute meeting should be able to do some good work. It is worthy of note that, according to statistics, 82 per cent. of the women of America do their own work, which is a very complicated business. A woman is not merely a bread maker, but she has to have a knowledge of so many things. She has to teach her children theology. She has at times to be doctor and nurse, cook, baker, paper-hanger, decorator, dairy maid, butter maker and mistress of all the other trades and professions that are necessary in a comfortable home. Here is where our Institutes of Domestic Science come to our aid. Of these we already have several, one at Toronto, Hamilton, and, most important of all, the MacDonald Institute at Guelph. I hold that every girl should have a training at one of these institutions. If we keep these institutions full to overflowing, more will spring up to meet the demand. I expect that before many years we will have schools of Domestic Science not only in every county, but in every town and village in the Province. There is now a preparatory course for little girls in connection with the public schools, that is spreading like wild-fire. Take for instance the city of Toronto,—already there are five of the public schools provided with necessary rooms and equipment for teaching the rudiments of scientific cookery.

These classes consist of girls from 10 to 14 years of age. Pupils in the fourth book are given one two-hour lessons every week, while junior pupils are given one and a half hours. These girls are learning to set the table daintily and to serve foods appetizingly, to have method and cleanliness in their work, home sanitation and various household economies. Besides the public schools, there is the Lillian Massey School which has a weekly class for young girls. The Evangelica House on Queen St. has a domestic science class and there is a class of little girls from a near-by public school who meet weekly at the Y.W.C.A. on Elm St. This is a sort of club among the girls themselves, and each pays just one cent for her weekly lesson. This is not all. At the Broadview Institute there is a well patronized class of boys who, they say, learn about as fast as the girls, and even in the Italian district there is a class of girls who are very eager to learn. Just now I think that the Women's Institute is the best and only scheme to help Canadian women in the best sense of the word.

I have been a member since the beginning, or at least since it began in North Grey, and I can state that I have never seen or heard any attempt at gossip in the Institute meetings. Every woman should give her daughters a training in an Institute of Domestic Science, if in her power to do so, that her life work may become a pleasure and not mere drudgery. I trust the day is not far distant when our daughters will begin housekeeping, complete mistresses of domestic science.

Every woman in Canada should be a member of the Women's Institute and attend the meetings as regularly as possible. Every woman can send in any good things she knows will be a help to the meeting. Failing this, she can do as the proverbial little wren who caried a tiny drop of water in her bill to the ocean, and as she dropped it in, piped out "I helps." So every woman can drop in a quarter and say "I helps," thereby giving the encouragement of her goodwill and sympathy.

WATERLOO CONVENTION.

The Convention held at Preston on October 24, 1907, brought together representatives from both north and south ridings, and the success attending the meeting was beyond the expectations of those who were instrumental in organizing the convention. We can give here only one of the many excellent addresses delivered.

Lonely Women: By Mrs. E. Richmond, of St. Jacobs, Ont.

This is not a learned paper: the dictionary has not been searched for big words, or old reports for set phrases. The incidents related are personal knowledge, gleaned from the east and west of the province.

Woman's place in the world is the home, first, last, and always. There is something in what a Scotchman said, "What looks so silly as a wumman buddy on the platform?" And what is worse, we feel silly. It is for love of our homes we disregard "looks" and feelings, and make an effort of this kind.

There is little, if any, objection to girls in town taking positions in offices, etc., but when girls from country homes where they are needed, enter offices and factories, it is because someone has blundered. I will try to show who is to blame.

A few weeks ago when the Bishop of London honored Canada with a visit, almost his parting words were: "What glorious children you have in

Canada " Bright, happy, intelligent, well fed, and well clothed, it made his kindly heart ache when he compared them with the many half-starved dwarfs of the old land.

A French-Canadian, born and educated in the City of Quebec, spent a few weeks in rural homes in this part of the province. On the eve of his departure for his city home he said: "I have enjoyed this visit and henceforward will have a happy recollection of homes in Western Ontario. What has pleased me most is your women. What splendid women! Neatly and becomingly dressed for work, church or marketing. Homes clean, orderly, and arranged with taste. Intelligent, courteous, kind. Thoughtful for guests. Children well fed and polite. And the food is beyond description. The tables set are fit for kings."

Splendid women—just one fault—the meekness with which they accept the thoughtless neglect of their husbands. The husbands read and doze, and doze and read all evening without even saying "excuse me." Or, when the day's work is done, go for a walk, or chat with a neighbor without asking their wives to go along. Do they forget that work in the house has been as hard as in the field, and possibly more tiresome and dreary? Would it be too much to expect some thoughtful companionship for those whom they pledged at the wedding altar to love and cherish? There are hearts lonely and homes ruined with this selfish neglect. "Splendid women!" "Glorious children!" That's as strangers see us. Let us note how some of them are treated.

A "glorious girl," with little schooling, can scarcely read and write—at fifteen a motherless girl, with six younger brothers, the youngest a delicate infant. The young shoulders bent to the burden, and how they must have ached, when sewing, mending and knitting are all done in the home, and it is well done, by the one pair of hands. The family seat in church is always full on Sabbath. If any remain at home, it is the girl mother. An old maid? No! A thousand times no. She has been mother and grandmother to the brothers and their children. They are frugal and saving and farm after farm is added till each of the sons has a hundred acres. The father is dying, they are all at the bedside. He says to the boys, "Be good to your sister, she will have a home amongst you. She has been a faithful daughter." To the son who receives most he says: "You will pay her so much yearly, say fifty or a hundred dollars." It is paid once or twice, and he stops. He says: "It is like a rent, and father must have been in his dotage to put a burden like that on a fellow, and she may live to be eighty." She may; she is tough with hard work. She is too broken-hearted, sad and lonely to complain, and family pride ties her tongue.

Our Women's Institute is ten thousand strong. We have been quiet too long. Let us shout for justice. Did she not earn and deserve the best farm the father had? When a baby girl, his first-born and most precious possession, at baptism he promised to teach her truth and justice. Would that fathers would teach justice by example!

It is good fathers who make this mistake. Job was a good man and upright, with seven sons and three daughters. The sons are given property and have homes; not a word of girls having anything. Job is bereaved of his children and afflicted with boils. He has time to do some hard thinking. When prosperity returns and sons and daughters with it, we are told the girls' names—and listen to the exact words: "And their father gave them inheritance among their brethren. After that Job lived an hundred and forty years." He did not wait till he was dying to do justice. "And in all the land there are no women so fair as the daughters of Job " It is not

cosmetics make them fair. It is their interest and joy in life. They will not leave their homes for dingy counting-houses or noisy factories.

There is another injustice to correct. Husband and wife labor together for years, the one doing as much as the other. The husband dies without a will. The law gives the children who are of age the right to demand their share inside of one year, and break up the home. There are one or two States which allow only thirty days to divide everything when the father dies. That, too, in a country which shouts itself hoarse about its boasted liberty, freedom and justice. It is easy to say "hear, hear," when the trouble is at "Uncle's."

We all know mothers who are lonely, neglected, shoved out of the old home. In a few years they are at rest. The doctor calls it heart failure. It's a broken heart for want of love and justice from those who would not have a home over their heads if it was not for her unceasing toil for years.

With tears streaming down their cheeks mothers have told me they would like to see the children who are away. They will not come home. One or two of the boys get the property so arranged that there is nothing for the rest. Disowned, treated like an outcast, the mother's heart is breaking for a sight of the absent ones.

A doctor in one of our asylums asks what is wrong that the asylum is filling up with wives and daughters of well-to-do farmers. Stop and think of the injustice. It is not a wonder there are so many losing their reason. It's a wonder there are so many sane.

Does this paper read like women's rights? These are some of our rights:

"Right to be brave, right to be true,
Right to think rightly, and rightly to do,
Right to be loving, right to be just,
Right to be worthy of infinite trust."

Right to be just, and a right to justice. Love without justice is not deserving the name of love.

We are horrified at heathen sisters binding the feet of their baby girls, but, if the lives of women and children are miserable with injustice, are we any better?

For those who have never seen the wilder parts of this banner province I would like to describe one lonely home.

Away north of Kingston in Rideau Lake region, there is an island of ten or twelve acres of rock with a little earth thrown in. As you approach the dwelling you see half an acre of poor potatoes and as much more of something that looks like oats. The barn or outbuildings will shelter two or three pigs and sheep and a cow, if she could be squeezed in at the low door. The shelter is roofed with sods. Some children scamper out of sight, clothed like South Sea Islanders, each wearing a frightened grin. Knocking at the open door, a masculine-looking woman is stuffing dirty clothes into the woodbox. The floor is clean, polished with sand, whitewashed log walls, stove innocent of blacking, heavy iron tea kettle, table as long as room will permit, two benches at either side, three broken chairs, one bed, a ladder in a corner into the garret. Not a clock, lamp, newspaper, book or picture, is in sight. After our repeated knocking, the woman flounces into the middle of the room. Her walking skirt of brown denim was a good six inches from the floor, bare feet that for wear and tear would make French kid blush—Ontario kid, made in Canada. The joints of her hands were like small potatoes, her face like a

thunder cloud, and a tongue that snapped: "What are you standing there for? You can walk in; the door's open."

Wishing to wait while a boat is rowed round from the opposite side of the island, I talked and told stories and tried to entertain as I have seldom done. After a while she said, "I have not laughed so much since I was a girl." As you look at the hard, expressionless features, you wonder if she ever knew what girlhood meant. Saying good-bye, as far out on the waves as we could hear the sound of her voice it was, "God bless you," and "God bless you," and "Won't you come again?" It's a row of eight or ten miles to the nearest postoffice, and there are weeks and months of every year when a doctor could not go to them if they were all dying.

Talk of courage! There on the sunset side of Clear Lake, the days will grow longer, shadows will lengthen and darkness set in, and the weary body will be buried on the hillside with scarcely enough earth to make a decent grave. Will it be irreverent to think that the spirit of the lonely one will be shocked, frightened and bewildered with the beauty, grandeur, and countless shining hosts of "over yonder?"

There are many lonely, isolated homes where it is impossible to have Institute meetings. And they are too poor to send daughters to Macdonald Institute for six months or a year. Could they not all be sent the annual report, and could there not be put into each report some plain recipes, such as was in the bulletin on "Fruit, Vegetables and Honey?"

We are a goodly company—ten thousand. Ten thousand splendid women. Let us not devote too much time to ice cream, crisp salads, and eyelet embroidery. There are greater things.

There are old customs to abolish, unjust laws to be made just, and lonely homes to gladden. No one's life is lived in vain who adds some golden rays to another life, and instead of a gem or even a flower, give to the heart of a friend a beautiful, just thought, and we will hear from Windsor to Ottawa, from Lake Erie to the far north, what the lone woman said on the shores of Clear Lake, "God bless you, and God bless you."

REPORT

OF THE

FARMERS' INSTITUTES

OF THE

PROVINCE OF ONTARIO

1907.

PART I.—FARMERS' INSTITUTE

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To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it Please Your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Farmers' Institutes of Ontario for 1907.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1908.

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FARMERS' INSTITUTES OF ONTARIO

1907.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to present herewith the thirteenth annual report of the Superintendent of Farmers' Institutes.

The report of Ontario Institutes now appears in four volumes—Farmers' Institutes, Part I., Part II.; Women's Institutes, Part I., and Part II.

This volume, Part I., Farmers' Institute report, is composed of papers and addresses delivered by Institute lecturers and local speakers at Farmers' Institute meetings, also some articles which have been specially prepared for this report. It is to be hoped that the farmers of the Province will read these articles carefully and make practical application, so far as possible, of the lessons taught therein.

Part II. of the Farmers' Institute report contains statistics regarding the work throughout the Province as well as announcements of meetings, speakers, and their subjects, and notes of special value to officers and directors of the Institute.

We wish to urge the farmers who are members of the Institute to renew their membership from year to year. By keeping files of the reports sent out by the Department from time to time, the farmers will be able to follow the different lines of work pursued at the Agricultural College, at the Winter Fair, by the Dairymen's Associations, and in connection with Institute meetings. Each year a number of old members drop out and new ones are secured. We wish to retain the old members so far as possible and at the same time to extend the membership. Each member should make it his business to induce others to join in the work of the Institute.

We trust that not only the directors of the Institute but the regular members will make their wants known to the secretary for the district as well as to the Department, and it will be the aim of the Department to furnish speakers who are specially qualified to give addresses upon lines which are of particular value to the districts concerned.

The history of Institutes both in the States of the Union and in Ontario from the time of their establishment until the present shows an attendance and interest which is not in keeping with the importance of agriculture to the state, and those who do attend meetings and read the reports are for the most part those who are the least in need of education along agricultural lines. It is, generally speaking, the men who are most successful farmers that have taken the deepest interest in the meetings of the Institute. The problem has always been how are we to get the attention and co-operation of the men who are not following up-to-date methods. We trust that those who attend the meetings, and especially those who hold office in the Institute, will each do his part in an endeavor to induce the farmers of his locality to take a deeper interest in the meetings and the addresses by delegates sent out by the Department, and, if possible, to arrange for the establishment of local organizations for the purpose of studying up-to-date methods in agriculture and their application to local conditions. The Farmers' Institutes might well profit by the experience of Women's Institutes in Ontario. The holding of regular monthly meetings throughout the greater portion of the year by the local organization and their dependence almost entirely upon local talent for entertainment, addresses, and papers has given a stability to the work of

Women's Institutes which is not found in the farmers' organizations. If the farmers of each locality will only establish a Farmers' Institute Club or some other organization which will give them an opportunity for the consideration of problems which are of interest to them as farmers, a benefit will result which cannot be derived by depending upon one or two meetings during the year to which lecturers are sent by the Department of Agriculture, and at which only a limited time can be given to the discussion of local problems.

Write to the Superintendent of Institutes as to particulars for the formation of these Clubs. We must look largely to the young men for the establishment and carrying on of this work. We trust, however, that the fathers will lend their assistance towards the organization of local Clubs and express the hope that they will at the same time encourage their sons and neighbor's sons to take an active interest.

In connection with the Club work as well as the regular Institute meetings, arrangements should be made for some practical work which is of local interest—judging classes for live stock and seeds; identification of weeds; discussion of methods of cultivation and rotation; lines of breeding for the different classes of live stock, etc.

We appeal to the farmers and their sons to make a study of the reports sent out; and not only should these reports be carefully read and carefully studied, but the articles which appear in our excellent agricultural papers from time to time should be carefully read and the principles set forth or the experiences cited, applied so far as possible to local conditions.

There is probably no need that the farmers of the Province be furnished with much additional information on agricultural topics or that we supply lecturers for a greater number of meetings, but rather that the farmers make an intelligent application of the principles advocated and the recommendations made from time to time. This can best be done when the farmers of the locality have some organization through which the experiences and opinions of the farmers of the locality can be given for the benefit of all and at which free and full discussion can be had.

We wish to draw the attention of our readers to some of the articles appearing in this report. If the recommendations outlined by Dr. Reed in his article on "The Breeding and Care of Horses" were followed, the horse industry of the Province would be placed upon a much sounder basis and the profits would be largely increased. The same statement holds good in reference to the recommendations of John Campbell regarding the production of beef cattle and of R. S. Stevenson in reference to "The Care of the Dairy Cow." Dairymen generally would do well to consider carefully the review of dairy conditions as given by Mr. Frank Herns, Chief Dairy Instructor for Western Ontario.

The reprint of articles from the annual reports of the Fruit Growers' and Bee Keepers' Associations will, we trust, be of general interest. The articles by William Johnson on "The Natural Life" and "Why boys leave the Farm" should be carefully read and weighed by the farmers of Ontario, especially the young men.

We again appeal to the farmers of Ontario to make a practical application of the fund of information which is furnished them each year, and we trust that the Department may have a continuance of that co-operation which has made the Institute work so valuable in the years that have gone.

GEORGE A. PUTNAM,
Superintendent.

PARLIAMENT BUILDINGS,
Toronto.

SELECTED PAPERS AND ADDRESSES.

THE BREEDING AND CARE OF HORSES.

By Dr. Hy. G. Reed, Georgetown.

The breeding of horses is attracting more attention at present from the farmers of Ontario than perhaps at any other period in the history of the Province. The high price to be had for any kind of a good horse during the last two or three years, is no doubt, responsible for this condition.

However, some breeders are somewhat apprehensive that horse breeding is being overdone and that the result will be overproduction and that many colts now being reared, will two or three hence, have to be sold for less than it cost to raise them. But while it is very true that we have had periods of depression in the horse trade in the past, and are very likely to have them again, the man who breeds the right kind of horse need not have over much fear of overproduction or depressed condition of trade. He may not always be able to command the present high prices but to judge from our experience in the past, the time is not likely to come when there will not be a ready market and a fair price for a really good horse.

In the past we have been breeding too many general purpose horses. This is due to the pernicious practice that obtains so much among many farmers in certain sections of mixing up the different breeds and the result is almost sure to be the general purpose animal. In fact this manner of breeding is about the only way in which this class of horse can be produced. None of the recognized breeds in their purity will produce him. He is almost invariably a cross-bred animal.

Now the general purpose horse is all right in his place—a most useful animal, but the supply is almost always in excess of the demand and as a result the price realized is much less than for a draught horse, and it is only a few years since the best animals in this class would not sell for enough to pay the cost of rearing them, while the poorer specimens could not be sold at any price.

The farmer who is breeding general purpose horses may well fear overproduction in the near future, and if a period of depression in the horse trade sets in, he will realize that he has not been breeding along those lines that will make for his best interests. The man who is going to make the most out of horse breeding is the man who produces some special purpose horse such as a draught, a carriage, a road or a saddle horse. And while there is no doubt that the draught horse is the most profitable for the average Ontario farmer to breed, still to some men the heavy horse is objectionable and when a man's taste prompts him strongly to the lighter horse, he can indulge his taste and still produce a horse which he can sell at a profit, provided he breeds a special purpose animal.

Now, the question might be asked—What is a special purpose horse, as distinguished from a general purpose animal? The answer is: a special purpose horse is an animal that because of his breeding and conformation is specially adapted to certain kinds of work and is out of place at anything else. The ideal draught horse is an animal suitable for the moving of heavy

loads and he is not adapted very well for anything else. The same may be said of the carriage, road or saddle horse. They are all specially suited for certain kinds of work and do not appear to advantage at anything else. The general purpose horse is not specially adapted to any particular work but he is not hopelessly out of place at any work to which he may be put.

Now the man who breeds a good special purpose horse of any of the classes just mentioned, must breed along special lines. In order to get the best he must have at least two or three crosses of the one breed in his stock. The breeder who thoughtfully selects his breed and then sticks right to the one breed, generation after generation, keeping his best females for breeding purposes and always using a good pure-bred sire, is bound to produce an animal that will do him credit as a breeder and put a handsome profit in his pocket when he offers his produce for sale.

Selecting a Brood Mare.

If all the brood mares in the Province were well bred, sound and of good conformation, the value of the horses produced in any given year would be increased probably one-third. There are hundreds of mares in the country which will give birth to foals next spring, that should never be allowed to reproduce their kind at all. We have enough poor horses now, without allowing very inferior mares to increase the supply in the future.

A brood mare should be a well-bred animal. She should be reasonably sound. She should at least, be free from any blemishes that are known to be hereditary, such as spavins, ringbones, certain forms of blindness and roaring; a mare with any of these blemishes or diseases is very likely to transmit them to her progeny and is quite unsuitable for breeding purposes. Then, good conformation should always be looked for in a brood mare. An animal with poor conformation can never by any possibility be a high-class horse and it is a serious mistake to allow a mare of any marked weakness of conformation to breed as she will surely reproduce her own weakness in her progeny. Weed out the poor brood mare and we have made a very long step in advance in our horse breeding industry.

Selecting a Sire.

The breeder who raises good horses will always be careful as to the sire he selects. He will get the very best to be had in his community and will always insist on the horse he uses being a registered animal. No careful breeder will ever use a grade sire even though as an individual he may be a high class animal. A grade animal is all right for working purposes. A dealer will pay no more for a registered cart horse than he will for a grade. If he can find the type he wants he will buy and does not care a straw whether the horse is pure-bred or grade—type is all he wants. He cares nothing about the ancestors of the animal.

But for breeding purposes we look for more than individual excellence. We become at once interested in the ancestry of the horse. We want to satisfy ourselves that not only is the animal in himself a good typical horse but were his ancestors for many generations back equally good and typical? It is one thing for a stallion to have type himself and quite another thing to know that his type has become established through a long line of ancestors in order that he may have the power of transmitting to his progeny his own desirable characteristics.

The grade horse with common ancestry only one or two generations back, is a dangerous animal to use for breeding purposes even though in himself he is all right. A large percentage of his progeny will resemble to a greater or less extent his undesirable ancestors. We cannot get away from the action of the law of reversion. Our greatest safeguard against its action is to breed from registered stock.

Strictly speaking, cross-breeding is the crossing of two pure-bred animals of different breeds but the crossing of grade females with a sire of another breed is practically cross breeding. In some sections in Ontario where the Clyde horse has been bred for the past forty years and the average brood mare is either a high grade or a pure-bred Clyde, some farmers have been induced to mate their highly bred Clyde mares with a Percheron stallion. Nothing but failure can ever attend such a line of breeding, for while the first cross of such a mating might not be altogether a failure, the moment you start to breed these cross-bred females you will realize the extent of the mistake that has been made. They will not breed true to any type. They are a mixture of two distinct breeds and you cannot have the least dependance on their progeny having any distinct type at all. The man with a well bred mare who makes such a cross, simply loses all progress he may have made and goes back to where he started with his mongrel mare.

Care of the Brood Mare.

In the care of brood mares, previous to foaling, there are two things of prime importance, viz., a reasonable amount of good food and regular exercise. I suppose it very seldom happens in Ontario that a mare is not provided with sufficient food but many do not get exercise enough. In order that a mare may have a reasonable chance of giving birth to a strong healthy foal, she should be in a vigorous condition herself and such condition is impossible without regular daily exercise. Most mares will take sufficient exercise if given an opportunity by being turned out every day. Some, however, of a sluggish temperament, will not even though they get a chance, and such animals should be made to exercise by being put to some kind of light work. In fact, a mare is better doing any reasonable farm work every day right up to foaling, than standing in the stable nearly all the time during the winter.

Fat in a mare is no indication of good condition. Excessive fat is a sure sign that the animal is out of condition. A horse is in good condition only when every organ in the system is strong and healthy and performing its functions in a proper manner. This is only possible under the influence of regular and sufficient exercise. If brood mares were kept in prime condition themselves in the manner just described, there would be far fewer weakly foals born, than we have each spring. The newly born foal is likely to be in as good condition as its dam and no better. If the dam is soft and flabby for want of exercise, the foal will likely be soft and weakly too. If the dam is a weakling, the foal is almost sure to be one too.

Care of the Foal.

If possible, let the dam have a month or two rest after foaling and if you want to give the foal the best possible chance, let the dam have the whole summer with nothing to do but nurse the foal. Teach the little fellow to eat meal or grain before weaning and as soon as weaned, give him a liberal supply of good food such as clover hay, well cured, or good pasture

with a regular allowance of grain or meal, at least twice daily. Many foals get such a back-set at weaning that it will take the best of care all winter to restore them to the condition they were in when deprived of their dam. If the foal becomes very much run down at weaning, it is doubtful if he can ever be made quite as good as though he had been better looked after at that time. Weaning is a critical time in the life of a foal. Be good to him then and it will pay you well for your time and trouble. A colt should be cared for in such a way that he will increase in weight every day for the full growing period of his life. And yet there are hundreds of colts that each spring of their lives will weigh much less than they did the previous fall when they went into winter quarters.

Winter Feeding of Horses.

Horses in winter quarters should be made to eat each meal up clean and stand to an empty rack for two or three hours before they are given the next meal. Many farmers waste tons of good hay each year by allowing idle horses to stand with hay in the manger nearly all the time. The average horse will eat more hay than is good for him if he gets a chance. In this way much good food is wasted and worse than wasted for the digestive organs are likely to become deranged and sicknes follows. Idle horses in the winter are much more likely to become diseased, than they are in the summer when working hard and the reason is that in the summer they get three meals a day with several hours fasting between, while in the winter in many cases it is only one meal a day, fasting from morning till night.

The Care of the Sick Horse.

While few farmers are justified in attempting to treat a horse that is really sick, yet every farmer ought to be able to do something for a sick animal till professional help can be obtained. Improper feeding in the winter produces much digestive sickness in horses. Now a horse with an acute attack of indigestion is in the utmost need of veterinary help. There is not much use of pouring medicine into the stomach. As that organ is in a deranged condition, no assimilation of anything put into the stomach takes place, and consequently no action is obtained by administering drugs through the mouth. The injection of concentrated medicines under the skin, is the only rational way of treating such cases. No ordinary farmer has either the instruments or skill to do this. But the sick animal should be placed in a big box stall plentifully provided with bedding and a careful man with him to prevent, as far as possible, the patient from injuring himself when the pains are very intense.

Many a horse suffering great pain has just thrown himself down violently on a hard floor and burst the stomach (which had been distended with gas) and thus destroyed whatever chance there might have been of successful treatment. It always gives some relief to cases where there is great abdominal pain to take hot cloths wrung out of a pot of hot water and applied as hot as the patient will stand, to the lower part of the abdomen. This is usually easily done as the animal is in almost every case lying down and in many cases lying on his back. Much can be done in this way to keep the patient from injuring himself till veterinary help arrives.

Horses suffer more from pulmonary diseases in the winter than in the summer because stables are not in many cases ventilated sufficiently. Poor ventilation predisposes to lung trouble and many a simple cough or cold

develops into inflammation of the lungs just because the patient is standing in a poorly ventilated stable. The average case of influenza or even colt distemper will not need very much medicinal attention if the patient is allowed an abundant supply of fresh air. Keep the body warm by plenty of clothing, stimulate the circulation in the extremities by hand rubbing the legs. Keep the bowels relaxed by the use of succulent food. If the breathing is labored, apply a hot poultice to the throat and chest and you will have gone a long way towards preventing any complications from setting in and will probably not need any professional advice at all.

If a plentiful supply of fresh air is necessary to maintain a horse in good health, it will readily be understood how necessary it must be to an animal which is suffering from any respiratory trouble. Fresh air is of the utmost importance in such cases. The most skilful medical treatment will be useless without it.

HORSE BREEDING.

Dent Dalton, Delhi, Ontario.

Horse breeding is an industry that requires the very best thought and attention from the farmer and breeder, in order to make it either profitable or to derive pleasure from it.

It is necessary, in the first place, to consult your own inclinations. I have always maintained that horsemen are not made either by example, or teaching, but are born. If a man is not a born horseman, he will not succeed. I do not wish you to understand that I do not think teaching and example are not of value. I think they are very valuable, but I do say the man should be a natural horseman to commence with.

If the young man thinking to start in the horse business is inclined to like the roadster, carriage, or saddle horse, let him, by all means breed in that direction, as he will never be a success with the draught breeds. If on the other hand, he is in favor of the heavy breeds he should breed in that direction, as in my opinion, the successful breeder must take pleasure and pride in his horse, so that he will give them that thought and care which cannot be obtained from a mere business standpoint.

In the first place if he is in favor of the light harness horse, he should fix his ideal horse in his mind, then select a mare as near to that type as possible, keeping every point in mind, size, color, action, and conformation, and then select a sire of as near the same type as possible. It is an old saying, and seldom fails, that like begets like.

At the present time, I think there is no horse which brings as high price as the carriage horse. The man who has a matched pair of bays, browns, or dark chestnuts, standing from fifteen to sixteen hands high, good conformation, good knee and hock action, and a fair amount of speed, has not long to wait for a customer, who will buy them at a price equal at least to two or three pairs of ordinary horses.

Now, as to the best method of breeding that kind of a pair. In my opinion, there is no horse to-day, that so near fills the above type as the hackney. As it is almost out of the reach of the ordinary farmer to get the hackney mare for a brood mare, he must of necessity do the next best thing. I would recommend a standard bred mare or a mare with as much standard

blood in her veins as possible. The mare should be sixteen hands, or very near it, of good color, good bone, and plenty of speed, in order to transmit to her offspring a goodly showing of speed, as the hackney horse is a little deficient in both speed and size, and these should be made up as much as possible by the mare.

Above all, select a mare perfectly sound, and one that goes straight, as the law of heredity is very strong, and is sure to show itself in one or more of her colts. If there is natural weakness, or unsoundness in the mare, or if she has a faulty way of going, she is almost sure to transmit the same to her progeny.

Always bear in mind, that the best mares are none too good to breed from. Some year ago, I was offered $450 for a mare I had. My friends strongly advised me to sell her. I refused the offer. I still have her, an old mare almost useless except for breeding. I have never regretted it, as she has raised me a number of very valuable colts—one a winner of the Sweepstakes in Toronto for best mare any age in the carriage class. I could not expect to do this with an ordinary mare.

In selecting the stallion, great care should be taken. Above all, get an animal as near faultless as possible. Be sure to see that he goes straight, graceful, and fast. Look well to his breeding. If possible select one from a prize winner strain or family. Experience has taught me that a stallion will breed back to his dam oftener than any other way. I think it very important that a stallion should have a good dam. If you can trace back and find his dam a great prize winner, it is, in my opinion, the very best recommendation he can have. The hackney is not naturally a large horse, so do not look for too much size. The true type of a hackney is a horse from fifteen to fifteen and a half hands high, some a little larger, low, thick set, up-headed, washy, hardy fellows weighing from ten to twelve hundred pounds. From my own observation, I have always found when you get an unusually large one he is deficient in some way. He either lacks ambition, action, speed, or is a big washy fellow or lacks something that is necessary to make the ideal horse. If mated in this way the breeder will meet with few disappointments.

In raising the colt, do not be afraid to feed plenty of good nourishing feed, particularly the first winter. Some farmers think there is danger in feeding grain to a colt. Give the colt plenty of room to exercise and play. There is no danger of feeding too much grain after he has become used to it. On the other hand, it is very easy to ruin a colt by over feeding, if kept in a small enclosure without room to run and play. If you intend to make a show colt of it, be sure to halter break it the first winter,—educate it, lead out on the line, running beside it as you would in a show ring. Teach it to show all its good qualities every time you take it out. Half the success in the show ring is being able to show all there is in the colt or in other words to have it well broken. Many a good colt has come out of the show ring without a prize simply because it was not properly broken, and well handled in the ring. I look upon the show ring as the very best school a young man can attend for a horse education. He there learns the kind of horse that is in demand, he also learns the breeds that are prize winners. He also learns how to handle horses if he is at all observant and watches the successful exhibitor lead or drive his horses, and above all he becomes filled with the spirit of ambition and competition, so necessary to bring out the very best horsemanship there is in him. It is true he will meet with some very discouraging decisions by the judges, either through ignorance or meanness on the part of the judges at the small shows. I would much rather take

my chances with good horses at Toronto, London, or other large shows, than at the small township shows. You there meet a better class of judges, who neither know you nor care who you are. They know a good horse when they see it, and judge it on its merits. I am pleased to say these abuses are being remedied, as a great many societies are getting Government experts to judge horses, and the young beginner is more likely to get justice.

SOME POINTS IN WHICH MANY FARMERS FAIL IN THE PRODUCTION OF BEEF CATTLE.

By John Campbell, Woodville, Ont.

Why is it that we read week after week and year by year of the very small percentage of good beef cattle marketed in Toronto? There are seasons of the year when really good expert cattle are plentiful, but it is the exception. We, of late, have been reading reports of daily runs of 50, 60 and more carloads offered, and in the whole lot not more than 6 fairly good butchers' bullocks (not to speak of exporters') were in evidence. The fault lies not with the dealers, as they would much rather handle good ones, as they are the kind that give them pleasure and profit in shipping. The mismanagement can be traced right back to the farm, and it begins long before the calf is born. At the start, quite often the mistake is made in the cow or heifer selected to raise the beef-making animal from. The cow specially adapted to the production of milk and that alone, will not mother the calf fit to grow with profit for the block. Here is where the false start is made, which seldom if ever, ends in anything but actual loss. If we are to produce milk by all means let us use the dairy bred cow. But if our aim is to grow beef profitably, we must have the cow with the tendency to store flesh on her body, and having that, our first step is to secure the use of the proper type of bull. There are some who give due consideration to this very important part of the business. One of any old sort will answer for far too many people. Others are satisfied if they use one which a bit of paper proves a registered animal. Many registered animals are at service here and there just because registration is taken as a proof of goodness, while the fact is that, of all scrubs, the registered scrub is the worst.

In order to produce the beef animal successfully we must have knowledge of what constitutes the proper type, as demanded by the dealer in first class beef, his customers being the guide to him in his selections. To grow the good beef bullock a person must have a proper ideal fixed in his mind. For without that ideal to work up to the chances are, a hundred to one, that the production shall be deteriorating instead of improving as the years go by.

Even when the selecting and mating has been well done and the resulting calf a good one, the first stage only has been safely got through with. There are those who, by their way of caring for the youngsters, appear to think the task done when a good start in life is given them. The fact is that many, very many, properly bred calves have all their chances for growing into profitable animals destroyed, by the want of care the first months of their lives. Putting calves on separator milk when but a few days old is unnatural. The butter-fat removed, nature's tonic for the undeveloped stomach, is taken away. To give a calf a chance to show its worth as a maker of beef,

it is well to allow it to suckle the dam for two or three days, after which, whole milk should be fed for four weeks. Then skim-milk may be gradually substituted until in ten days, it only is given, with the addition of a small quantity of flax-seed, (a dessert spoonful at first and increased to half-a-cupful at four months), simmered for hours in a pint to one quart of water, twice a day. We have frequently seen calves when a year old not as heavy as they should be at three months, and all because they were half starved on a full supply of milk, made unhealthy, and largely wanting in nutrition from the cause above stated. The calf-flesh lost, and a pot-bellied half grown yearling, the outcome of early mismanagement, are results which we can find by the thousand in most counties of our Province.

In endeavoring to understand why so many people will pursue a course which cannot possibly give either pleasure or profit, one is apt to get bewildered. When it is so easily proved, and so generally admitted, that it never pays to finish for the market the animal which requires twice the necessary years to reach it, because of the early handicap of semi-starvation, the mystery is, why do people not practice according to what they believe?

Another very common hindrance to the successful production of finished beef cattle, is the lack of sufficient grass, in the summer season. It is already a well established fact, that the well bred growing steer will add one hundred pounds to his weight in the field with plenty of feed, at *one-fourth* the cost of adding one hundred pounds weight in stall-feeding. Therefore we can readily understand how next to impossible it is to secure profit from the bullock which is kept on short feed the summer or two that he lives on the farm. To illustrate this very important point coupled with the right or wrong line of breeding, I will mention two cases. About two years ago a feeder in one of western counties purchased a bunch of yearling past steers at the low price of $14.00 each. He wintered them, and carried the lot on through summer and finished for the market early the second winter, selling at $22.00 per head. That meant a certain loss of at least $12.00 to $15.00 each, depending on the way they were fed. It was gathered in conversation that they were not the right kind to start with. A month later in the year we bought a nice bunch from a neighbor, of similar ages at $27.00 each. They were good, thrifty, shorthorn grades, and so attractive in the field by the road-side that they were secured, largely as an experiment, to test the question of carrying them over a winter, or buying the following September to finish on rape in the fall months, and five to six weeks in stall for the Christmas market. Thus finished and weighing, 1,350 pounds average, and selling at 5½, they made $74.00 each. Their total average cost was $52.00, making the handsome profit of $22.00 each as the result of our thrifty neighbor's good breeding, and our own fairly liberal feeding. They actually made us a profit per head equal to the full selling price of those bought at practically half the price of ours. In the county where these latter were fed and bred, many good useful bulls are kept for service. The fault lies mainly in the neglect of the calves, and lack of grass; two shortcomings which are costing the people of said county tens of thousands of dollars each year, and possibly hundreds of thousands, as no less than 147,218 cattle are owned therein.

For years we have been doing a little in connection with other lines of stock-raising, in the way of finishing cattle for Christmas time. The best available are bought, and the above average price cheerfully paid. Turned on rape in September with a field of long dry grass nearby, and fresh water in easy reach, with salt at will, the growth and gain in flesh is quite marked. This system of fall feeding seems to put them in good

condition for a short, heavy-feeding time in the stall, as demonstrated during the past three years. So satisfactory has it proved that at present we have a bunch which last month cost us $4.50 per hundred or $57.00 each. As they are already contracted for we are confident of their making us handsome returns. In stall-finishing a month to six weeks' heavy feeding is profitable. A 1,300 pound bullock will make good use of 60 to 100 pounds of Swede turnips, 9 pounds meal, 4 pounds nutted oil cake, and a full supply of clover hay daily. Three months in the field and one in the stall have for years given us a monthly increase each of 70 pounds weight, and that with well-fleshed cattle to start with. The added weight is, in a large proportion, meat of the better quality. The thickening of the flesh is not to be valued in quantity alone. There is even a greater increase in the quality and flavor. This is proved by the fact that year after year cattle so selected and fed are readily sold at top figures to one of Toronto's meat dealers, who caters to the highest class of trade. We can easily realize that good, well-bred, and well-fed cattle please all who handle them, and why? Simply because they fully answer the purpose the different interested parties have in view. The grower is satisfied, the finisher has reason to be in that the good ones respond so quickly and so well to full-feeding. The killer is never disappointed as the percentage of dressed weight is so high, and the quality such as to please the most fastidious of his customers.

While we buy annually, we think it a great mistake, for those who rear well bred bullocks to sell them before fully finished, and thus command the highest price possible. How many are to be found, who grow the bacon hog up to 100 pounds, and sell to a neighbor to finish for the market! Few. The principle is the same in both cases. The finishing process when well done is where the best profits are found. Before our registered shorthorns became numerous, we, for over twenty years, raised nearly all the steers we finished. Never once did the good ones fail to yield fair to good returns. We did once or twice buy poor ones at dirt-deep prices to fill up the stalls, but *always without fail* they proved a vexation of spirit, never paying for their feed. The more we had of such and the longer we kept them, the poorer we were.

On the other hand fall calves, well wintered, and pushed a bit the following summer, have been finished at 18 to 30 months, giving much better returns than spring calves marketed when 6 to 12 months older. We did, many years ago, delay finishing till they were 36 to 38 months old. That was when heavy cattle made fancy prices. A pair of 37 months' old bullocks sold for Easter trade at 7½ cents per pound. As they weighed nearly 1,900 and 2,000 pounds, the $270.00 realized represented a considerable margin to the good, even if special care was given them every day they were in our possession.

We have, in recent years, purchased 11 month old calves, well-bred of course, at $25.00 and sold them three months later at $45.00 for slaughter in our county town in early June.

From thirty years' experience in breeding and feeding cattle for the market, we can bear testimony to the fact of properly bred and rightly fed cattle being a most reliable source of fair to real good returns. These years of high prices of coarse feeding grains, we have in *oil cake*, a feed which is of the best and comparatively cheap, a feed which is not in Ontario appreciated as it is deserving of. We are using it in increasing quantities, and now feed six or more tons yearly, besides all the grain grown, or its equivaent. It proves valuable not only as a feed but also as a builder-up of soil fertility, and that means increased production.

The general causes of failure throughout Ontario, in making beef-growing profitable may be put in a sentence or two: Mixed and inferior breeding, improper care of the calf during the first six months of its life, the want of maintaining regular growth from start to finish, and the selling off when but half-finished, are mistakes costing us millions each and every year. We are strongly of the opinion that were the majority of cattle growers raising half their present numbers and pushing the smaller number on rapidly to the market, they would secure dollars of profit where they do not get cents, as the business is now mismanaged.

THE DAIRY COW FROM THE CALF TO MATURITY.

By R. S. Stevenson, Ancaster.

Importance of the Sire.

As no treatment will perfect that which is born imperfect, the first essential in raising good dairy cows is to start with calves that are bred from a sire of one of the breeds that produce the fewest poor milkers. As life is too short for the average farmer to do much experimenting, it would be wise for him to choose a sire from one of the special dairy breeds. The basis of all the improvement the average man can make in his herd must be the pure-bred sire, and to get calves that are worth raising for dairy cows, the sire of those calves must have the tendency bred in himself, in order to transmit it to his daughters with any degree of certainty. The amount of experimenting the average man is able to do in this direction is necessarily limited. In the natural course of events, he acquires more experience in calf raising in two or three years, than he is able to obtain in selecting the heads of his herd in a lifetime. This shows the necessity of supplementing his own meagre experience with that of other men in the same line of business.

Definite Type.

First and foremost the dairyman must have a distinct idea of the type of cow he wants, then the economical production of milk of course, should be the first aim. At the same time he must not ignore the fact that butter-fat is the most valuable constituent of milk, and we should try to increase the solids of milk rather than the total production. In saying this, I do not endorse those who would condemn all cows that do not come up to a certain standard of butter fat. A cow should be judged by a standard of profit or loss

Now the most valuable characteristics in the breeding of the dairy bull, are the number of performing cows that appear in his pedigree. The tendency of all live stock is to revert or breed back, so the fewer inferior cows in the bull's pedigree, the less likely, he is to produce inferior cows. When the time arrives that a dairyman has to change his bull, let him be sure to procure a bull of the same breed, as he has been using. By this method, he will in a few years, succeed in grading up a herd of cows that will be a source of pride to him as well as profit. The indiscriminate crossing of the different breeds of live stock has been the curse of the stock breeding of the whole Dominion of Canada.

Considering the importance of the sire in fixing the dairy qualities of a herd, there is no wonder that many men are asking: "What are the marks of a good dairy bull?" After a good deal of experience along this line, I have come to the conclusion that no man can select a bull, solely from his appearance, that would produce good dairy cows. His great reliance must be the bull's pedigree, and the number of good cows that appear close up to him in it.

Raising the Calves.

The dairyman must remember that nothing grows into a cow but a calf, so if we want good cows, we must raise our calves in such a way that they will be likely to make good dairy animals, as no matter how well bred the calves may be, they can be largely spoiled in the raising and handling of them until they have dropped their first calf, and in fact until the first lactation period is past.

The best practice in raising calves for dairy work is to remove the calf from the cow twenty-four hours after it is dropped, as if allowed to remain longer with the dam it is more difficult to teach it to drink from the pail and the cow also frets very much more. The reason for leaving the calf with the cow at all, is that it gets its first milk in the natural way and the licking the cow gives it, is good in starting the circulation of the blood in the young calf. The calf should be fed three times a day at least until it is two weeks old, with its mother's milk and always warm. If the mother's milk does not agree with the calf, as is sometimes the case, feed it the milk of some other fresh cow.

At about four weeks old, a portion of sweet skim milk may be substituted for the whole milk, and by the time the calf is six weeks old, it may be fed all skim milk, but it must always be warm and sweet. As a substitute for the butter-fat that we have taken from the milk, we have found nothing better than scalded flaxseed or old process oil meal, commencing with a tablespoonful and gradually increasing the quantity as the calf grows older and shows it can stand it. There is no cast iron rule about the amount as some calves can use a great deal more than others. .

When the calf is six or seven weeks old, we put a handful of oil meal in a little box in its pen, where it can reach it. They soon learn to eat it, and become very fond of it. This does away with the necessity of scalding the meal. A few whole oats are much relished by calves and there is nothing better for them. The whole oats are preferable to ground oats, as the calf has to chew them more, and they are more thoroughly mixed with the saliva, and are consequently better digested. A small bunch of nice green clover hay should be tied up and hung in the calf's pen. They soon learn to eat it and it is excellent for them.

The chief aim in raising calves for dairy work is to grow a good strong animal, with a good digestion, adapted to handling the coarse foods of our farms without making them fat. For this reason we do not feed cornmeal to calves, that we intend for the dairy, as it has a tendency to make them too fat. We must bear in mind that we want these calves to give milk in paying quantities, when they become cows, and not to put the product of their food on their backs in the form of flesh. So we must take advantage of everything we can to give them a tendency to go the way we want them to when they become cows.

Many a well bred dairy calf has been spoiled as a milker, simply by being allowed to become loaded with flesh when young. Care must be taken

not to allow calves to overload their stomachs, especially with separator milk. This is a frequent source of indigestion. A gallon at a feed is plenty. They are naturally greedy and will always take more than is good for them. Calves should have milk for six months and eight months is better.

We keep all our calves in loose boxes, one in each pen if possible. They do much better than if tied. They are never turned out the first summer, as the annoyance they are subjected to by flies, and the hot sun, very much more than counterbalances any good they may derive from being out. And moreover milk and grass are not a good combination.

One of the greatest troubles in calf raising is diarrhœa or scours. This disease is caused by indigestion and indigestion is usually the result of improper feeding, such as cold milk, sour milk, too much milk at a time, feeding from dirty sour pails, keeping calves in dirty pens, etc. This disease often begins with constipation which soon gives place to diarrhoea, by which the irritant matter may be carried off. At other times it may turn to inflammation of the bowels. Fever sets in and the calf gradually sinks and dies. Give one or two ounces of castor oil and twenty drops of laudanum to clear the irritant matter from the bowels. Care in the feeding after that will usually result in a cure.

Calves should be fed a small ration of grain, up until the time they go to pasture. The first year of the animal's life is the most important, and if stunted, no amount of good feeding and care can regain that which has been lost. Our heifers are bred so that they will drop their calf at two years and a half old, I think they make better cows than if allowed to get to three years before dropping their first calf. It is of great importance to keep heifers milking for a long time with the first calf, as this is the lactation period in which the habit of a long, persistent milker is established in the cow, and if allowed to go dry at say six months, they will do so every time afterwards. We prefer to have heifers drop their first calf on grass, as their udders seem to develop better than when on winter feed. Heifers should be in good flesh when they come in, and as soon as they have got safely over calving, usually in ten days or a fortnight, begin to feed them all they will stand and force the milk production, and develop the udder and mammary glands as much as possible. Sometimes a heifer will not come up to our expectations with her first calf. I would not condemn her on that account, as some of them are a little slow in developing. Give her another chance, and then if she does not make a fair showing, unless there is some special reason for it, you cannot get rid of her too soon.

Length of Time to Milk.

Cows should continue in milk up to within two months of freshening again. Some cows are difficult to dry up. They are altogether too scarce, however, but they are better to have a rest; they will, I believe, give more milk when they calve, and you certainly will have a stronger and more vigorous calf. From six to eight weeks before a cow is expected to come in, she should not be fed much grain, especially corn-meal, or any heavy grain that is likely to cause a feverish condition at the time of calving. Bran is a safe feed, or oat chop, if not fed too heavily. Cows are better to calve in the stable at all seasons of the year. A loose box stall well bedded, should be provided for them, and it is a safe practice to give them a pound of Epsom Salts about twenty-four hours before you expect the calf. At this time great care must be taken that the cow does not catch cold, and in cold weather it is safer always to blanket them for twenty-four hours after calving.

One of the worst risks that the dairyman has to run with his cows, is what is commonly called milk fever. This disease which used to be so fatal has now largely lost its terrors, as since the oxygen or air treatment has been discovered, there is no danger of a cow dying if taken in reasonable time. The treatment is simple and consists of pumping the cows udder full of air. It is always better to get a veterinary surgeon, if one is available. If not, get a bicycle pump and a milking tube. Sterilize the milking tube and attach the air pump, and fill the udder with air. Massage and fill again. Do not attempt to give medicine, as in this disease the throat is paralyzed and the cow cannot swallow.

Feeding and Care of Cows.

To attain success in dairying, it is not only necessary to have good cows, but we must feed them economically in order to make money. It is not difficult to get large flows of milk from our cows if we do it regardless of cost, so the dairyman must endeavor to grow most of his own feed. Fortunately, for the Ontario dairyman, there are two foods, nearly all of us can grow on our own farms, if we go about it in the right way, that will supply a very large part of the food that we require. These foods are corn and alfalfa. The former is well known, and no up-to-date dairyman tries to get along without a good deal of corn. There are a good many, however, who are not getting out of their corn crop what they should from the fact that they have no silos.

Alfalfa is only grown to a limited extent, but the sooner farmers wake up to the advantages of it the better for them; from experience I have found that with good ensilage and alfalfa, cows can be kept up to a good flow of milk with very little grain. We have fed our cows all kinds of hay but we never had any kind that gave us as good results as our alfalfa.

The water supply for dairy cows is of the utmost importance, milk being about eighty-seven per cent. water. How is it possible for a cow to do her best if she is not supplied with all the good clean water she can drink? It will pay dairymen to go to a good deal of expense to have water put into their stables, so that their cows can get it when they want it.

The salting of cows is another thing that is often neglected. Cows should have access to salt every day. It is a good plan to sprinkle a little on their feed, but not an excessive amount, as some cows are like people and require less salt. When Dr. Robertson was at Guelph, he carried on an experiment with cows to find out what effect with-holding the salt would have on the milk flow. The result was that the cows that got no salt for two weeks, skrank seventeen per cent. in their milk.

Milk Records.

There is one other important thing in the building up of a profitable dairy herd, and that is the weighing of the cow's milk. Too much stress cannot be laid on this for we may breed as well as we can, still there will be some cows that will not be profitable and the final test is the scale and the Babcock Tester. A dairyman should fix a standard for his cows, six thousand pounds of milk in the milking year is not too high, and any cows that will not give that amount will not pay anyone to keep, and the sooner they are out of existence the better. The daily weighing of a cow's milk is very little trouble, and the time it takes is not worth mentioning. After a man

once tries it, he will become more interested in the individual cows in his herd. He will become a better feeder. He will in fact, become a dairyman in the true sense. He will put more business into his dairying and will consequently make more money.

A man must be careful not to condemn any of his cows without giving them a fair chance to see what they are capable of doing, as I know there are more good cows in the country than there are good feeders. One of the reasons why dairying does not give better returns is that many farmers never provide any soiling crop to carry their cows over a drought in the summer. This is a matter that never should be neglected as the crop is never lost, for if not required during the summer, it can always be made into hay for the coming winter.

In conclusion, the essentials in procuring a profitable herd of cows are first—breed your calves from dairy bulls, then feed them as indicated and weed them out when they do not come up to a certain standard of production.

DAIRY CONDITIONS IN WESTERN ONTARIO.

By Frank Herns, Chief Instructor for Western Ontario, London, Ontario.

Dairying in Western Ontario has been in some sections on a fairly substantial basis for many years, yet there are numerous dairy problems not yet fully understood by the average producers of milk, and no doubt it will take years for the industry to be fully appreciated and understood. During the past five or six years rapid progress has been made by milk producers in investigating and applying more economical methods in the production of milk and cream, and sending it to the factory in proper condition. They have been taking more interest in dairy education and adopting methods advocated by successful producers, dairy experts, Institute workers and others. It is only by constant effort on the part of dairy workers and the convincing proof of success by the best dairymen that the careless patron can be induced to try more profitable and up-to-date methods. The high prices of dairy products has also stimulated patrons to go more largely into dairying.

The great Northwest is a competitor with Eastern Canada in grain raising, and there is no doubt that the home consumption of dairy products will increase as the population increases, and that an assured market will always be found for dairy products. The Old Land will always take our surplus, provided we can supply the quality asked for, and it is very necessary that quality be considered as well as quantity. The majority of factories have made more cheese and butter than in 1907. No doubt the more favorable season had a great deal to do with this increase, yet the general tendency is toward more cows, and better feeding methods. For a few years, particularly in the southwestern portion and the far northern portion of Western Ontario, dairying seemed likely to be replaced by other methods of farming, but we now find a growing interest in creamery work and dairying in general in the southwest and also in some sections of the north. Cheese factories in the north have also done exceptionally well this year in quantity as well as quality. There are now three milk condensers and one powdered milk factory being operated in the four best dairy sections; these

will no doubt have an effect on the cheese factories in the immediate neighborhood and will perhaps close some and reduce the make of others below a profitable amount, yet undoubtedly these conditions will adjust themselves in time. The cow population will no doubt rapidly increase in the sections where the condensers are located, and in a few years they will be able to secure the quantity of milk they require within a small radius, thus affecting only those factories which were located in close proximity to the condensers.

Some Weak Points in the Industry.

There are still some weak points in the industry. Numbers of patrons have not been paying sufficient attention to the production of the herds, have not been weighing and testing the milk of individual cows, and are apparently not aware of the great difference in the amount produced and the profits from different cows. Many cows are kept at a loss instead of a profit, through the neglect of the producer in actually finding out the true situation. It is well known that a poor cow costs as much to maintain as one which will produce at a profit, and it sometimes seems rather peculiar that closer business methods are not followed with regard to milk production. By weeding out the unprofitable cows and building up herds, individuals of which will produce profitable quantities of milk, success is more certainly assured, but so long as any patrons keep on feeding cows which produce at a loss just so long will they continue to say "there is no money in dairying." The problem, however, has been closely studied in the best dairy sections; Cow Testing Associations have been formed and through these Associations good results have been obtained. Many producers after having weighed and tested the milk from the individuals of the herd for some time have been amazed at the very little real knowledge they previously had in regard to the actual production and profit of some individuals of the herd.

Another weak point which is rapidly being looked into by intelligent dairymen is the shrinkage of milk and consequent profits during the dry hot months when dairy products are usually at a high price. Patrons in the best dairy sections are beginning to realize that the quantity of milk should be kept up during the whole milking period, and they are turning their attention to some system that will provide succulent food to substitute green pastures. Numbers of patrons have found out that well matured corn silage is not only a cheap food for winter but also for summer milk production, and that they were able to keep up the milk supply from their herds during the hottest and driest weather while their neighbors' herds which were not supplied with either summer silage or green crops of any kind rapidly decreased in milk flow below a profitable amount. In sections where dairying has been made a sort of side line, the providing of soiling crops or summer silage has not yet been taken up to the extent that it should be, but in the best dairy sections a larger number of silos have been built during the past year or so and used for both summer and winter feeding, than in the previous four or five years. In fact while driving through many of the best dairy sections, new silos are noticed being built on every second or third farm. The growing of alfalfa is also increasing.

Again, the difficulty encountered in trying to presuade some patrons that immediate cooling after milking and proper handling of the milk until it reaches the factory will when overcome result in increased profit from the standpoint of both quality and quantity. It seeme difficult to get some patrons to realize that improperly cared for milk or cream, when mixed with other milk or cream which has been properly handled, brings the whole lot down

to a low level and affects the resulting produce unfavorably, thus causing a loss not only to themselves but to those patrons who are endeavoring to produce and care for milk and cream by the right method.

Better Care of the Raw Material.

The Dairy Instructors realize that no factor has more to do with the general improvement in the quality of cheese and butter than the greater care the patrons are giving the milk and cream. That it pays, is shown by the general improvement in quality all over the dairy sections. Even during very hot weather this year, in factories where the patrons realized that on them depends to a great extent the responsibility of improvement, very little difficulty was experienced by the makers in turning out a fancy grade of cheese, provided the curing room was sufficiently well insolated to prevent the cheese from being ruined by high temperature after being placed in the curing room. The Dairy Instructors all report a great improvement in the quality of milk and cream delivered at the factories this year, and that better methods are being adopted by the majority of the patrons. There is, however, room for much improvement along this line. There are still many patrons who are careless about cooling the milk and cream. In many sections no facilities are provided for proper handling of the milk, such as tanks, milk houses, cold water, or ice. Where ice is so plentiful and cheap, a few tons stored in comparatively cheap ice houses would be a great help in cooling the milk during the hot weather.

Many patrons apparently have drifted into dairying, and instead of handling it from a business standpoint, use it as a sort of side line. No amount of skill on the part of the cheese or butter-maker can convert poor raw material into finest cheese or butter.

Factory owners have responded very well indeed to the appeal of the Instructors for better and more sanitary conditions of the factories, and up-to-date methods of making, and it is to be hoped that the time will come when there will be no factories in Western Ontario which cannot be pointed out with pride as fit and proper place for the manufacturing of dairy products.

Uniformity of Product.

The fact has been recognized ever since the co-operative factory system was introduced that uniformity of product is one of the main objects to be gained and helps to make the factory system a success. This can be best obtained by having the raw material of good quality, producing a sufficient quantity within a limited radius to make the factory profitable, and placing in the factories as makers men who are recognized experts in their calling. The hiring of cheap makers is a great mistake, and such men are usually dear at any price in the end. The building of too many small factories is also a cause of lack of uniformity in the finished product, since the greater the amount of milk or cream that can be manufactured under one expert manager, the cheaper can it be done and the more uniform the product, thus commanding a higher price. Small factories should not be built unless they are really needed from an economic standpoint.

Effect of Returning Whey in Milk Cans.

In past years the returning old sour whey in the milk cans has been one of the causes of inferior milk and bad flavored cheese, and has no doubt had an effect in causing patrons to imagine that since such stuff could be

returned in the cans it did not matter so much about the flavor of the milk sent to the factory. The whey tanks were not kept clean at the majority of factories and these tanks and their condition has been one of the evils of the factory system for many years. The system of pasteurizing the whey recently adopted by numbers of factories in Western Ontario is having a marked effect on the condition of these whey tanks. The quality of the milk has improved wonderfully where the pasteurization of whey has been introduced and done properly. It bids fair to do away with most of the evils arising from returning unclean whey. Pasteurizing the whey to 150 degrees also makes the tanks so much easier to clean that dirty ill smelling tanks are now in the minority instead of the majority. The patrons very readily recognize this change for the better, and are quite willing in the majority of cases to pay the small cost for fuel necessary to supply the steam to pasteurize the whey. Proper pasteurization of the whey, keeping it sweet and clean, retaining the fat properly, increases its feeding value, improves the milk supply, does away with yeasty flavors in the cheese, and benefits the industry in numerous other ways. These benefits more than counterbalance the small cost of heating. Proper facilities for pasteurizating the whey and keeping the tanks clean should be the aim of factory managers and patrons if the whey is to be returned in the cans, otherwise the evil results from unclean whey tanks will never be remedied.

Importance of Good Curing Rooms.

It is somewhat discouraging to see large quantities of finest cheese made during the warm weather and placed in curing rooms, the temperature of which rises so high that it affects the cheese very unfavorably, when for a nominal cost cool curing rooms could be established. If the patrons of factories would co-operate and contribute each their share of the cost it would not be felt by them, and the profit derived from superior quality and less loss in shrinkage would far exceed the cost. Cheese made from the very best milk by the most skilful makers will not stand temperatures ranging from 70 to 85 degrees, and be finest quality when cured. However, it is gratifying to note that more cool curing rooms are being built each year in Western Ontario. It is hardly fair for patrons to expect that the private owners of factories will bear the whole cost of a cool curing room, but in most cases the owners would be quite willing to pay their share of it. Joint Stock Companies could easily build such rooms by having the co-operation of all the patrons towards the expense.

During the very hottest weather this season the cheese in the cool curing rooms were equal in most cases to late fall made goods, while the milk supply at these factories was possibly not much superior to the milk supply at other factories; so that it is quite evident that it is somewhat inconsistent to urge a better quality of milk and then allow the cheese to be injured and heavy shrinkages to occur by placing them in curing rooms which are not properly insolated.

Use of Babcock Test in Creameries.

The introduction by the creameries of the Babcock test to replace the oil test (only 13 out of 73 creameries pay by oil test) has been a decided step in advance in improving the quality and richness of the cream, and the condition of the butter, and in equalizing more properly the distribution of the proceeds. Very few creameries are now paying by the oil test, and if patrons thoroughly understood that the oil test is considered out of date and very uncertain they would insist that it be replaced by the Babcock test.

Increased Production.

By putting on more cows and producing more cream in some sections, it would put the situation in such shape that the creamery men would be able to collect the cream more often and thus insure a better quality, but as it is now in several sections where the cream wagons have to travel over a large territory to secure a load of cream, it is claimed that the cream is collected as often as it can be made to pay. Skimming a richer cream and more frequent collections would certainly go a long way toward improving our cream gathered creamery butter. Pasteurization of the cream would also improve the quality but the claim is that the buyers do not make a large enough difference in the price paid for butter made from pasteurized and unpasteurized cream to make it profitable. This will not hold true in all cases. Grading of the cream if it could be made practical would no doubt be a step in advance towards improvement. Pasteurization does not relieve the situation of the evil arising from improperly cared for cream or infrequent collections.

More attention should be given by the patrons to the location and washing of hand separators. They should be thoroughly washed and scalded each time after they are used. Anyone who says that good flavored cream can be produced by washing a separator once per day when the milk is put through on two occasions is ignorant of the first principle of proper dairy management.

Large quantities of farm dairy butter is still made in Western Ontario. It is recognized that there has been considerable improvement in the quality of dairy butter in the past few years, but in going through the cold storage warehouses it is amazing to see the enormous amount of good pure butter-fat that has cost money to produce, made into butter of such inferior quality. Thousands of dollars must be lost each year to the producers who offer such butter for sale. If the cream were properly handled either at home or sent to the creamery, surely the profits would be greater and less inferior butter would be placed on the market to come into competition with finest grades. The great defect of farm dairy butter is lack of uniformity in flavor, color, texture, salt and packing. In a 100 package lot it may be difficult to find a dozen that would grade the same. This butter all comes into competition with creamery butter. True it appears that there can always be found a market for inferior butter but it must be at a loss to the producer, there is not enough difference in price paid between good and poor dairy butter by those who buy it, since merchandise is usually given in payment; and the good and bad butter is nearly always bought at the same price, the merchant trusting to get rid of it to dealers at a very small profit and making his profit on the merchandise sold. The merchants, therefore, pay a price which allows them to take good and bad without distinction, but this system allows no difference between those who produce good and those who produce poor butter, the manufacturer of the poor butter getting the advantage. The cows which produce pure milk, containing good pure butter-fat are often blamed because a profit is not made on the butter, when the real trouble is that the owners completely spoil the product by unskilful methods. This is also true in handling milk or cream for the factories. There is considerable dairy butter made which is quite equal to creamery butter, but such small quantities are made in one place that it does not get the advantage in price that creamery butter usually does, unless the producers have special customers who appreciate good butter. It would be more profitable and far better for the trade if cream which is made into butter could be sent to the creamery and made into a more uniform grade of butter.

The payment for milk by the test at cheese factories seems to be one of the most difficult problems to deal with successfully. In 1907, after years of effort by dairy teachers and others only nineteen out of 207 cheese factories in Western Ontario were paying by the test; a few more factories adopted the test system this year, and it is to be hoped that larger numbers will see their way clear to take up the matter in 1909.

The system of dairy instruction and inspection which is being carried on by the Ontario Department of Agriculture is having a good effect on the trade. Instructors have from 30 to 35 factories to look after and all factories are visited at least once and most of them several times during the season. The Instructors go from factory to factory continually, looking after the milk supply, visiting patrons whose milk comes to the factory off in flavor, advising them as to the best method of caring for the milk, advising the makers as to best methods of making, and doing everything in their power to improve the industry all along the line. The benefits of such work cannot be estimated.

FARM POULTRY.

By M. C. Herner, Mannheim.

The poultry industry has been growing by leaps and bounds during the last few years, but we have every reason to believe it is, as yet, in its infancy. What was the bacon industry, and what was the dairy industry, before these subjects were taken up by the Farmers' Institutes and discussed at meetings throughout Ontario and the other Provinces? The lines of improvement were pointed out—how to increase profitable production, and how to improve the quality of the product. Note the development: Our country has in the course of a few years attained a place among the first in these two great industries.

What has been accomplished in these industries is equally possible in the poultry industry. Consider for a moment the great demand for dressed poultry and eggs, in our local market, to say nothing of the demand in the British Market, and who it is that should supply the demand?

The outlay or capital required to lay the foundations of a good paying flock of fowl is, I venture to say, smaller in proportion to returns, than in any other department in the whole realm of farming. Sizing up the conditions as they are, we find that in the average farmer's poultry-yard there is neither uniform type nor uniform quality, there is simply a motely flock of fowls, of all sizes, shapes and colors. As dressed poultry and eggs are the most profitable branches of poultry raising for the farmer, there should be some attempt made at improvement along these lines.

Attention should first be called to the quality of the fowls. The utility type of fowl is considered to be the most profitable for the farmer as they have both eggs and flesh producing qualities. In building up a good utility strain, selection and mating are the main points. Select ten or twelve of your best layers, birds of uniform type and quality, mate these with a pure-bred cock or cockerel of your chosen breed. Have the male bird as near the ideal of his breed as you can afford to buy. Do not forget that he composes half the flock, and on him depends the success or failure of the season's chicken crop. He must be a good, strong, vigorous bird. The hens should be pure-bred too, but even with common hens a farmer may, by using

only pure-bred males and by close application, work them up to a high state of productiveness in the course of a few years. Pure-bred fowls, however, cost no more to keep than the common barn-yard kind, and where the breeding yard consists of all pure-bred birds the returns may be considerably increased by selling the surplus stock for breeding purposes.

In selecting your best layers for the breeding pen, the trap-nest is one of the best devices. Through this medium, not a single poor layer need be in your pen; and surprising results will be obtained in the egg-producing qualities of your fowls. The time and labor required will be well paid for in the increased egg-production.

While eggs have commanded a high price all the year round for the last two years, yet the farmer who was able to produce winter eggs reaped the larger profit. The secret of winter egg production is right here:— Hatch your chickens early, give them proper care during the summer months, and you will save the fowls that will produce you winter eggs, provided you do your part. On early hatched pullets we must depend for winter eggs.

In feeding for winter eggs the aim should be to bring the conditions as near to nature as possible. A well balanced ration, plenty of exercise and fresh air are considered the essentials for winter eggs. The balance ration consists of a variety of grains, mash, and green food fed in liberal quantities, with free access to clean water and grit. All grain should be thrown in litter of straw over the floor of the poultry house, thus inducing the fowls to exercise. Cleanliness is an important factor in poultry raising that should not be overlooked as it is the stepping stone to success.

If the farmers of our country will introduce system in poultry raising as in other industries, the plea for better poultry and more of it will soon be brought to a successful issue.

THE CONSERVATION OF SOIL MOISTURE.

Chas. C. Nixon, B.S.A., St. George, Ont.

It has been observed at the Ontario Agricultural College that for every day's delay in spring seeding, after the first week had passed in which the seeding should have taken place, there was a great decrease in the yield of grain obtained. By actual experiment it was proved that there was an average decrease for each day's delay of 56 lbs. of oats, 53 lbs. of barley, 29 lbs. of spring wheat and 23 lbs. of peas per acre. This was due to the loss of moisture through evaporation.

There are few fields upon which crops of any kind, in any climate, can be brought to maturity, with the maximum yields that the soils are capable of producing, without adopting some means of saving soil moisture. There are fields, where, at times, the moisture of the soil is too great, and drainage becomes necessary; but even under these conditions, it will usually be found advisable to adopt measures for conserving the moisture not so removed. Plants must have water in order to live. In most cases, the rains of summer are insufficient to meet their needs. We must rely upon stored-up moisture.

Experiments have shown that, on the average, crops require two and one-fourth times the water that falls during the growing season. It is, therefore, apparent that we must aim to store up water in seasons when no

growth is taking place. Some seasons, however, we get too much water and it becomes necessary to make provision for carrying it off. Paradoxical as it may seem by preparing for a wet season, one also prepares for drouth. The loosening which favors absorption also favors retention of moisture.

Evaporation is the great source of loss of moisture. Few realize the enormous amount of evaporation that goes on from a given area of soil on a summer day. It has been estimated that from a surface of water 100x60 feet, there was an average daily loss from May to October of 20 bbls. At this rate, there would be an average daily loss of 140 bbls. per acre. The amount thus evaporated would, of course, vary with the situation, the exposure and the temperature. No definite data, to show how the evaporation from soil would compare with that from water, has ever been compiled. It is believed, however, that where soil is bare and it appears moist on top, the evaporation would be equal, or possibly greater.

To conserve soil moisture, then, is the great problem with which we have to do as farmers. The great agency employed for this important work is some system of mulching. Many kinds of mulches are available. The one most generally used is the earth mulch. It is simply a loose blanket of earth which dries out, preventing the water below from passing up through it to the atmosphere. The effectiveness of a simple search mulch in conserving moisture is beyond the comprehension of the average tiller of the soil. Experiments have proven that a mulch three inches deep prevented a loss of 36 per cent. of the moisture lost where no mulch was used. The average saving by means of mulches ranges from 25 to 50 per cent., varying with the depth of the mulch. To be the most effective, these mulches must be formed as soon as the soil is fit to work in the spring, as well as after every rain in summer, if the crop will permit. A delay of one week in spring, or after a heavy rain, will result in a loss of moisture by evaporation equal to one and three-fourths inches of rain, or enough to tide a crop over two weeks of drouth. From this data, the advantage of seeding at the earliest possible hour is apparent.

The first effect of mulching is greater evaporation, due to the larger surface of wet soil exposed. This loss, however, is from the stirred soil only. Very little water can pass through a mulch after it becomes dry. Should the mulch settle back and appear moist, a second stirring will be necessary. Mulches should not be made too deeply. They are made of the best soil and when this is dry, it is of no use for plant feeding. Mulches should be made as thin as is possible without permitting too heavy waste of the deeper soil water. The depth of mulches must vary with the seasons and with the crops.

Spring seeding is closely connected with this great problem of conserving soil moistures. Early seeding enables crops to use the water otherwise lost by evaporation. It may also save plant food from leaching in the drainage waters by having made use of this water in the plant economy. There is danger of too great haste in seeding, however. One might better be a little too late than too early. If too early, the plants come weak and sickly or the seed rots in the soil. The effectiveness of tillage in conserving soil moisture is greater in the spring than at almost any other time. In the spring, there is invariably a wet surface exposed and this wet surface carries water off much more radily than can dry soil. Too frequent stirring of the soil is undesirable. One should aim to keep simply a dry, loose blanket of soil, which will make the effective mulch. It frequently happens that owing to the area to be covered, it is not possible to work it all as early as would give the best results. In such cases,

where one has not time to form a thorough mulch, a single cut of the disc or even of the spiked tooth harrow will work wonders in conserving soil moisture.

All mulches need not be made from soil. Some of the best and the most effective are made from manure. By applying barnyard manure as a top-dressing, one obtains a physical, as well as a chemical benefit from it. The seasons' rains wash the fertilizing constituents into the soil, where they will be available to the plants. The refuse remaining on top makes an effective mulch for retarding evaporation. This double action of manure, when applied as a top-dressing, is a strong argument for pursuing this practice and for making use of the manure spreader, in order that the manure may be more advantageously applied.

The problem of soil moisture is intimately involved in the method of cultivation practised for root crops. With flat cultivation, less surface is exposed to the action of the atmosphere, hence there is less evaporation and consequently larger crops. It is well known to all that root crops, when grown on ridges in seasons of drouth, have small chance of succeeding. This accounts for the growing popularity of the level system of culture.

Under-drainage is also a large factor in conserving soil mixture. It is a matter of common experience that crops on well-drained soils will withstand drouth better than those on similar soils not so well drained although the crops at the commencement of the drouth were equally good. The explanation of this phenomenon is that drainage always improves the texture of the soil. With this improved texture comes increased capacity for retaining water.

Windbreaks and hedges are highly beneficial in conserving soil moisture. Especially is this true in times of high wind and particularly in connection with lighter soils. The clearing of forest areas and the diminishing size of our wood lots is involved in this question. The winds attain a greater velocity than ever, and a consequent greater loss of soil moisture is the result. Windbreaks and hedges, by holding the snow in winter, also add greatly to the moisture content of the soil through the melting of the snow in spring.

When we realize the full force of the tremendous loss of soil moisture through the agency of evaporation, we will look to it in future that this loss is held in check by the timely use of the simple, yet effective, means at our disposal.

HOW BACTERIA HELP THE FARMERS.

S. F. Edwards, Bacteriologist, O.A.C., Guelph.

The mere mention of the word bacteria or germs, or microbes, is sufficient to raise in the minds of many individuals a picture of disease with all its attendant suffering and worry, not only for the patient but for his associates as well. We shall hope to show, however, that not all bacteria are our enemies, and that those kinds capable of causing disease are really greatly in the minority.

Let us consider briefly the nature of bacteria and how they live. Contrary to the popular idea that they are animals, bacteria are plants, but so extremely small that a powerful magnifying lens is required to see them. The plants with which we are familiar vary in size, so also do bacteria. The smallest that we can see are about one fifty-thousandth of an inch in dia-

meter, and the largest about one ten-thousandth. Others are of sizes between these two extremes. It would seem impossible to measure objects so small that fifty thousand laid side by side would make a layer only an inch wide. Such, however, is the fact. In shape different kinds of bacteria differ. There are in general three shapes,—rods, spheres, and spirals. A stick of chalk, a ball, and a corkscrew serve to illustrate these kinds. Others are in the shape of rods slightly bent, and still others are branched or irregular in shape.

In order that bacteria may live and grow, certain conditions are necessary. Like other plants, they must have food, and that of a kind suitable to them. Some require one kind of food, and others a different kind. We know that farm crops, trees, and other plants, require the chemical elements,—carbon, hydrogen, oxygen, nitrogen and some others, for their growth. Bacteria, being plants, require all these same chemical elements, and the changes which we see caused by bacteria are made in their endeavor to secure these elements so necessary for their growth and multiplication.

Another condition for the growth of bacteria is plenty of moisture. They are made up largely of water, and unless plenty of moisture is available they cease to grow and many die.

A favorable temperature is also essential for bacterial growth. Other plants do not grow in the winter; so bacteria if subjected to cold temperature do no thrive. On the other hand, a high temperature, as of boiling water, quickly destroys them. Most bacteria grow rapidly at a temperature of 75°—100° Fahrenheit, or in "summer temperature."

Still another condition for growth is oxygen or air supply. Most bacteria require the presence of free air to grow and multiply rapidly. A few, one of which is the form which causes tetanus or lock-jaw, grows only in the absence of air. Hence, if a wound is kept open so that air can get into it freely, the bacteria will not develop and lock-jaw will not result.

We have, then, these four requirements for the growth of bacteria, viz. —Proper food, moisture, favorable temperature, air supply. By depriving them of any one of these essentials, bacterial growth is stopped, and we will see how this principle may be applied in ordinary farm operations in aiding, or preventing the growth of bacteria as may be desired.

In the soil, there are a number of kinds of bacteria which are of importance in preparing food for farm crops. There are in all soils potash, phosphoric acid, and nitrogen compounds, but they are often locked up, so to speak, in a chemical combination which the grains, grasses, etc., are unable to use. Bacteria of the soil effect a sort of decomposition of these compounds, placing the plant food in a condition in which it can be utilized by the higher plants. Other kinds of bacteria in the soil are effective in the decomposition of manure and humus of the soil, thus placing more food at the disposal of growing crops. All these desirable kinds of bacteria require plenty of air, hence the more thoroughly the soil is cultivated, the more favorable are conditions made for rapid growth and multiplication of these bacterial friends. Another kind of bacteria living in the soil forms little nodules or tubercles on the roots of clovers, alfalfa, peas, beans, vetches, and the like, and draws upon the vast supply of nitrogen in the atmosphere, storing up this most valuable plant food in the roots and stems of these plants, thus adding to their value, both as foods and as fertilizers.

In the dairy, the lactic acid bacteria cause the souring of milk and the ripening of cream, and give to butter its flavor, aroma, and keeping qualities. If it is desired to keep milk sweet, this can be done by cooling the milk to a temperature of 40° Fahrenheit, at which the bacteria grow but

very slowly. Other bacteria which get into milk with bits of straw, manure, hairs, or other filth, cause putrefactive odors and flavors. Ropiness, soapiness, colored milk, or other obnoxious and undesirable conditions of milk, may also result from these filth bacteria. Trouble with these may be avoided by strict cleanliness in producing the milk, thereby keeping them out of the milk altogether. Bacteria are also concerned in the ripening of cheese and imparting to it, its desirable flavor.

Disease-producing bacteria are about us, but the best method of combatting them is to keep our bodies and those of our domestic animals in a healthy, vigorous condition by strict cleanliness and right methods of living, so that disease bacteria are unable to get a foothold.

About the house, the preservation of meats by salting, depends partly upon withdrawal of water from the bacterial cells so they are unable to grow. Smoking of meats kills the bacteria present. Drying meats, fruits, etc., removes the water from these products so that bacteria cannot grow upon them. The keeping of foods by cold storage depends on the fact that the temperature is too low for bacterial growth. The housewife is able to preserve fruit by canning, because the high temperature kills the bacteria, molds, etc., which are always present on the fresh fruit.

Success with the vinegar barrel depends upon the yeast and bacteria which constitute the mother of vinegar, and which ferment the sweet cider, first to "hard cider" or alcohol, then to vinegar.

The preparation of home made root beer, so temperate, yet so sparkling, depends upon similar organisms. The lightness of the bread is due to the carbon dioxide gas set free by the yeast during the rising period. The souring which unfortunately sometimes occurs is caused by bacteria in the bread, similar to those which cause milk to sour and curdle.

These are some of the phases of everyday life wherein we meet with these tiny organisms. They are everywhere about us, in air, water and soil, and it is only by knowledge of them that we are able to encourage the growth of those which aid us, and to destroy those which would harm us.

THE FARMERS' INTEREST IN DENATURED ALCOHOL.

By Mr. C. W. Gurney, Paris, Ont.

The question of heating and lighting on the farm is becoming an interesting problem. We find our forests daily becoming less, our coal has advanced in price, and is controlled by large corporations; while coal oil and gasoline are in the hands of huge monopolists. It seems that we Canadians have been contentedly carrying the above burdens while other countries have been bestirring themselves in search of some substitute. We find that Germany, France and the United States have made rapid strides in the manufacture and use of commercial or denatured alcohol, which is an article which can be produced on our farms independent of any and everybody were it not for the restrictions placed upon it by our Government, which are so great as to make it prohibitive.

Germany has been bestirring herself for a number of years with the result that now the German farmer can produce his own alcohol for power, heat and light without any internal revenue tax; that they are appreciating

the action of their Government is best shown by the increase in the consumption of denatured alcohol, which we find from "The Scientific American" to be increasing at the rate of 20,000,000 gallons yearly (in round figures). The annual increase in France is at the rate of 1,000,000 gallons for heat and light, and this just after the introduction of their new laws, and no doubt when the people get better acquainted with its manufacture and use the consumption will increase much more rapidly. They have gone into the subject thoroughly and made exhaustive tests, and it would seem that taken all around alcohol is the best means of heating and lighting our homes, doing our cooking and furnishing power for our machinery.

The United States has also been alive to the fact that its people needed other resources than those they had for heat and light, and after extensive research and much opposition from some of the vested interests, a bill was passed through the legislature providing for the manufacture of alcohol for industrial purposes, free of internal revenue tax, provision being made for the denaturing of the same. This bill went into effect on September 1st, 1907.

We find that heating with alcohol is now no experiment. It has been used in laboratories of different kinds, notwithstanding the high price for a long time.

Mr. C. J. Zintheo, of the United States Department of Agriculture, states that alcohol was used for lighting, cooking and industrial purposes in the early sixties. Before 1861 the manufacture of spirits was free from special taxes, with the result that alcohol served a multitude of industrial uses. The consumption was some ninety million gallons. The city of Cincinnati alone utilized some twenty-four thousand gallons per day. Because of its low price alcohol was used as fuel for kitchen, bath and laundry. The imposition of the tax on spirits for revenue after the war was the means of upsetting this order of things and of destroying some industries altogether.

The term alcohol, as we are discussing it, does not apply to alcoholic beverages, which must of necessity be made from the choicest of materials, but to such that can be made from the coarsest, and in some cases, otherwise wasted, or nearly so, materials.

One of the reasons why this subject should appeal to us as farmers, is that we are the producers, as well as the consumers; we know by bitter experience some of the disadvantages under which we are placed where we have nothing to say about the production of some of the necessities of every-day life. We simply have to pay the price, bear the burden and make the best of the situation.

Mr. Clark, one of the committee on the ways and means of the United States, when the subject was being discussed by Professor Wiley, chief of the Bureau of Chemistry of the Department of Agriculture, says: "As I understand it, the opposition comes from four sources, (1) Those who think the Government would lose revenue; (2) Temperance people who think it would lead to drinking the stuff; (3) Wood alcohol manufacturers, and (4) It is hinted that back of the temperance people were the Rockefellers with the coal oil business."

The sources from which alcohol can be produced are all grains, plants and fruits that contain starch or sugar, and their value depends upon the amount of these elements that they contain.

In Europe (so says Mr. Wilson, secretary of Agriculture) the chief sources have been the potato and the sugar beet. He says that an average acre of potatoes such as we grow for table use, would produce about 250

gallons of alcohol, but they are now growing varieties especially for the purpose of making alcohol which produce 500 gallons per acre. So we see that in a year of low prices we would have market for our potatoes, also our small ones in the production of alcohol, which can be stored for an indefinite period for future use.

One of the writers on the beet for the production of alcohol says that a variety can be grown which will produce from one dozen beets two gallons of pure alcohol, and one advantage is that in the production of alcohol no element of fertility is taken from the soil, and the by-products would pay the cost of manufacture. In the United States, as with us, corn is one of the most profitable sources. Those who have made a study of it say that 50 bushels of corn would make 140 gallons of commercial alcohol, while if the stalks and all were used at the time of the glazing stage, the amount of alcohol would be nearly double. Apples also contain 8.4 per cent. sugar, so that our small apples and refuse from canning factories and evaporators would be made a source of revenue for us.

For lighting purposes, alcohol produces a light much like gas when burned in a mantle, (a mantle must always be used to light with alcohol). According to a test made by the electrical testing laboratories of New York, alcohol and coal oil gave the following results:—One gallon of alcohol gave 30.35 candle-power for 57 hours 5 minutes; one gallon of coal oil gave 30.8 candle-power for 28 hours 40 minutes, which shows that one gallon of alcohol gives nearly twice as much light as coal oil, as well as a superior light. It has also the advantage of not smoking the chimney, and the wick only needs an occasional cleaning. When once adjusted it will burn until the alcohol is exhausted, without any attention; it is non-explosive, and can readily be extinguished with water in case of an accident. To show the efficiency of alcohol for lighting purposes, the Imperial Palace in Germany is lighted with it, and one manufacturer reports the use of their lamps in 300 German and 200 European railway stations. For heating it can be burned in gas or gasoline stoves, and there are manufactured for its use numerous kinds of stoves and chafing dishes. The fires are started instantly and as quickly extinguished. In all the reports which I have been able to get, none of them place the cost at above 30 cents, and some down as low as 9 cents per gallon, and as it gives double the amount of heat as coal oil, you can easily see the saving. It can be mixed with gun cotton and then pressed into small tubes and burned in open vessels. An extremely handy utensil and one that is used extensively in Germany, is the alcohol flat-iron. These come in all sizes and weights up to 25 pounds and cost from $2.00 to $5.00. The heating is done by a tube-like burner inside the iron, with a small tank behind holding one-tenth quart of alcohol. The iron is ready to use in ten minutes after lighting, and lasts an hour without refilling, at a cost not exceeding 2 cents—reckoned at regular price in Germany.

For power purposes it can be used in gasoline engines with very little change in the construction, and has the advantage of not having that disagreeable odor. German automobile makers are using alcohol in preference to gasoline, it having the advantage of being non-explosive and odorless. It is also used on small pleasure boats. And the German farmer uses it in his traction engine to do his farm work and heavy hauling on the road, while his wife uses it to run her washing and sewing machines.

Give our inventors and manufacturers a chance to use their brains and skill, and who can tell what the results of a few years will bring?

It is also used in the manufacture of numerous commodities of every-day life, which, owing to the internal revenue cost us a great deal more than they would were alcohol placed on the free list. Among such may be mentioned lubricants, furniture polish, hatmakers' supplies, transparent soaps, quick-drying paints, ether, chloroform, camphor, photograph supplies, artificial silks, vegetable extracts, vinegar, smokeless powder, cartridges, lead pencils, etc.

This is a very important question and should receive careful consideration at the hands of our farmers.

ARTICLES ON BEE-KEEPING.

The following three articles have been taken from the Bee-keepers' Association report in which they were published for the current year. As the above publication goes to very few farmers in the Province it was thought well to publish these selected articles because of their bearing upon subjects of general interest. We are sure that practically every farmer in the Province will find profit as well as interest in reading them.

A CHAPTER OF MISTAKES IN BEE CULTURE.

By R. H. Smith, St. Thomas.

From the title of this paper assigned to me, viz., "A Chapter of Mistakes," one might be inclined to suppose that I had made a greater number of errors than other bee-keepers. While this may be so, I cannot bring myself to admit it. In looking back over my twenty-seven years of bee-keeping experiences it is easy to see what mistakes I have made that might have been avoided, and in this brief paper I would like to point out for the benefit of those who are commencing their bee-keeping career, the mistakes I have made or have known others to make, and that might have been avoided with profit.

When the average person wishes to make a start in bee-keeping, one of the first mistakes usually made is to reckon the profits or results before the bees are secured. My first mistake was to get bees in a wonderful patent hive that had so many traps and contrivances about it that were neither for use nor ornament, but were more useful as hiding places for moths or places in which to deposit propolis. My next mistake was to invent a hive, or rather an improvement on the hives then in use. Perhaps this was not altogether a mistake, as there was plenty of room for improvement; still, at that time, with my limited knowledge of the subject, I consider it a mistake. A plain simple hive accurately made and fitted with a standard size of frame is the best hive to keep bees in, for the simple reason that bees in hives of that description are more valuable when one wishes to dispose of them.

Another rock or mistake on which we were nearly wrecked was in supposing that the more that bees were allowed to swarm the more prosperous we were, while we found that almost the opposite was the case. We had often heard quoted the old rhyme "A swarm of bees in May, etc." Still in the average season in Ontario we found it better for several reasons not to allow swarming (if swarming were allowed at all) before June 15th, and then only to allow a limited number if honey production were the object.

A mistake commonly made is to commence bee-keeping on a large scale without a knowledge of the business or proper equipment. It is better to spend some time with an expert bee-keeper, or become posted in the main principles of bee-keeping, and in that way avoid the disasters common to the inexperienced. I think a bee-keeper is an object of pity if, on a hot day in July he has about 100 colonies which are allowed to swarm, naturally without clipped queens and perhaps few hives ready. He may surmount the difficulty with hard work and get each and every swarm safely housed probably by the end of the honey flow, and to his astonishment and disgust a few weeks later he may find that his swarms have dwindled to a mere handful of bees in each hive and many of them in a state of starvation, when to save them he has to double up to about the same number he started the season with. In the meantime the honey season is past, and our friend has the experience if not much honey.

The queens too, do not receive as much attention as they should have. This mistake often happens that failing queens are kept over from one season to another because perhaps, the bee-keeper has paid a good price for them, or they have done such good work, or are particularly handsome; where, if he had studied the best interests from a dollar and cent point of view, he would have destroyed them at the end of the second or third season, and replaced them with young and vigorous queens.

A mistake commonly made is to suppose that any locality will yield a good crop of honey every season. Some districts are better than others for light honey. Others may give a better return by yielding both light and dark honey in their season. We often hear of good results being obtained in some locality, and we are apt to say if we were only there how much better off we would be. Far off pastures always look green. Perhaps if we were there we might not do as well as at home. There may be as much difference in the bee-keeper, and his system of management or strain of bees as would make all the difference.

It is a mistake to suppose that a bee-keeper is saving anything by only providing or using one extractor or section super for each colony of bees. In an ordinary season I would not use less than from two or four supers. When we began bee-keeping we did not use any supers, but made the great mistake, common in those days, of extracting from the brood chamber. I sometimes think it is a great mistake for a bee-keeper to brag about how many pounds of honey he can extract in a day, because if the quantity is large one is apt to think that a large percentage of his combs were not capped, and it is one of the greatest mistakes a bee-keeper can make to extract unripe honey and put it on the market. Not only is the honey of an inferior quality and liable to ferment or sour, but the consumer is disappointed and is not likely to repeat an order.

It has been said that the introduction of an extractor has been detrimental to bee-keeping because some bee-keepers make the mistake of extracting too closely, and often leave their bees without sufficient honey to supply them through the winter months. In the fall of the year many bee-keepers make the mistake of neglecting to see that their bees have sufficient stores, and when cold weather comes in finds it too late to supply them, and so a large percentage die the following winter and spring.

When marketing honey it is a mistake to suppose it does not pay for the time taken to put it up in an attractive form. How often do we see some of the finest honey in sections badly daubed with propolis, and perhaps bulged combs, that are bruised and leaking, or put up in soiled cases. Any or all of these things make a difference of from two cents to five cents

per pound. Extracted honey, too, requires just as much attention, and if put up in glass jars, do not make the mistake of using any but clear flint glass neatly labelled and with a tight fitting cover.

This is only one chapter of the mistakes that are made by bee-keepers, and many others may occur to you, but if the mistakes I have mentioned should give rise to some discussion, its object will have been attained.

Mr. Holmes: It falls to my lot on this occasion to open the discussion on Mr. Smith's very valuable paper, and to note errors or omissions; in short, paradoxical as it may seem, I am to discover for our mutual benefit the mistakes in "A Chapter of Mistakes." I believe it will be generally admitted that the Managing Committee did a very noble act in placing that number on the programme, and that they were specially wise when they placed so intensely practical a man as Mr. Smith, of St. Thomas, in charge of it. What do I mean by "noble act?" Simply this: That by the publishing of this chapter of mistakes through the medium of the Ontario Bee-keepers' Association, and accentuated by the discussion following it, a warning, a red light, a danger signal, is placed at the shoals and reefs where, alas! too many have made miserable shipwreck and failure. These are they who have started well, meant well, and with neatly trimmed craft set sail, and all went well for a while, till they struck that first mistake, that sunken reef where all had appeared smooth sailing, and then in the confusion following they struck on other and worse mistakes until the wreck is complete.

A mistake is a wrong act unintentionally done, and a noble trait of character is disclosed in the raising of the warning note. What would be thought of the person who drives into a sink hole or a defective bridge, and breaks his carriage and perhaps maims his horse, and then goes on his way without setting up a danger signal, evidently wishing for the consolation of witnessing a similar misfortune to others? He would be considered a low-down fellow, unworthy of respect, and entirely lacking in the finer qualities which constitute a real man.

The references in the paper to rocks or mistakes on which the newly launched craft may be wrecked or damaged are very timely indeed. The warning is set for the beginner who thinks he can make a better hive, for the carpenter with a temptation. Then the arrival of swarming-time with a free hand and a few hives ready is a good point, deserving of special emphasis. Next, that special danger signal set against extracting unripe honey; an ambitious individual anxious to get there first, but who becomes an object of pity and scorn, as he does injury to his own interest and that of others by placing the thin, unripe article on the market. This red light of warning should be kept very prominent.

The mistake of having too few extracting supers is also noted. The position taken here might be assailed by some who claim that one super is quite sufficient, but in the main it is good advice, as, if in error, it would be erring on the right side.

But, coming to the point, some one has said, "If the storm of adversity whistles around you, whistle as bravely yourself; perhaps the two whistles may make melody," and was it Davie Crockett's advice,

> "Remember this when I am dead,
> Be sure you're right, then go ahead."

In the midst of all these danger signals so properly set in Mr. Smith's address, it would probably have made a good finish if he had told the beginner that the road to success was marked by a white light supported by a

tripod, the legs of which are Information, Imitation and Incarnation. Information sought earnestly and continuously; imitation of those who have done well; and incarnation, the embodiment or example in person as nearly as possible of the noble men in the bee-keeping world, all the way from Rev. L. L. Langstroth, of precious memory, down through the years to this present, who have given the very best of their lives to the study of agriculture, and have them cheerfully and freely handed down to others the knowledge secured at great expense and by long years of patient toil and study.

Mr. Lowey: There was one point I was a little disappointed in, and that is the point of so many swarms without clipped queens. I would like to hear from others who have had experience in the case of clipped queens with that many swarms.

Mr. Sibbald: I would simply cage each queen and leave her at the front of one hive, and keep on at work extracting or whatever I was doing, and let the bees look after themselves, and as a rule they divide pretty well. You might find one or two that get too many bees, but you can shake them and make two or three good swarms out of them. The others will probably divide themselves. If the queens are not clipped they will fly up into a tree and you have two or three hours' work over them. If you clip the queens you have the whole situation in your hands; they will separate better to their own brood on the old stand.

Mr. McEvoy: In case six or more swarms come off at one time these will, as a rule, drift into one heap and then in returning they will return sometimes too many to the one. I keep my bees on a single stand, and that is one thing in favor of the single stand. The first one that comes off is allowed to fly out and I throw a canvas right over the next. There will be a great roar underneath that, and they will turn back into the hive, but if I let all these loose at one time I will get into trouble. I like to have the queens all clipped.

Mr. Sibbald: Did you ever wait twenty-four hours to see what the result would be? Just let them go back wherever they like.

Mr. McEvoy: I have had them when there were too many tiered up. I think I had too many bees to be in one hive properly. The other plan works best, throw the canvas over. I would work no other system. Sometimes a lot of these queens need killing. I have had as many as seventeen queens caged. Sometimes it is a case of driving out the queen, that the hive was not in shape for its colony for swarming. I would destroy that queen and put in a new one.

Mr. Sibbald: I wouldn't let the queens loose for a day or two.

Mr. McEvoy: If there are six or seven coming off together would you let the bees go?

Mr. Sibbald: Let the bees go, but cage the queen.

Mr. House: I manipulate a large apiary upon the idea of the clipped queen. We have as high as twelve or fifteen colonies in one bunch. We pay no attention whatever to them, only as we pick up the queens and lay them upon the entrance board and go about our business, and it is very seldom we have any mixing done. If a swarm issued about the time one was returning they would possibly turn about and go in; but after they once go out and light, each one will separate and go home.

Mr. Laing: How long do you keep your queens caged?

Mr. House: That depends on circumstances; usually about forty-eight hours.

Mr. Timbers: I would like to ask how you would manage in the case of six or seven swarms that came off at once with clipped queens, one of which happened to have a virgin queen having superseded.

Mr. SIBBALD: They will ball her.

Mr. MCEVOY: That queen is going to anchor and hold them.

Mr. HOUSE: You shouldn't have any of these superseding queens in your yard.

Mr. STORER: How do you prevent second swarming all the time?

Mr. DICKENSON: We have been instructed lately that there is a very nice way of overcoming this matter of letting the bees run the bee-keeper by the bee-keeper running the bees. Shake and hive a lot of those bees on a nice day when it is not too hot.

Mr. CHRYSLER: I have been hearing for a year or two at least that swarming was a thing of the past. Now we are bursting out again, and we have lots of swarming, ten or fifteen at once.

Mr. SIBBALD: Because a person has gone through the experience in years gone by is no reason why he can't answer a question that he knows how to answer. I don't pretend to have such a condition; it hasn't occurred with me for some time.

Mr. HOUSE: I have three apiaries that nobody is watching during the swarming season, only as I see them once or twice a week.

Mr. COUSE: The discussion is on mistakes which most people have made. No doubt a person who has had the experience of handling a yard of bees where the queens are not clipped will know how long it takes to hunt 15 queens and put one in each of 15 hives. He won't do much more that day. If he had known enough to have clipped he wouldn't have wasted any time.

Mr. STORER: I have not had swarming for a number of years. I used to have lots of bees go away with the young queen. They won't swarm without a queen, but they will pick up a young queen somewhere and come out of the hive, and off they will go. I clip my queens and keep second swarming down, and so have had no trouble with them. I keep three out-yards and know the condition the bees are in. I shake them if I require to. I think I have not lost more than two per cent. of full swarms in a season in each yard.

Mr. MCEVOY: To what age do you keep your queens?

Mr. STORER: I leave that pretty much to the bees. The bees have some idea when there is anything wrong.

Mr. MCEVOY: You might have six or seven come off at a time.

Mr. STORER: I have seen them when you could shovel them up. I have piled four or five hives up on top of one another, and made a top entrance, and all manner of ways, and the bees settled it themselves.

Mr. MCEVOY: Haven't you had some that were too strong in that way?

Mr. STORER: You can always give them room to build up. I never found an exceedingly heavy swarm do much good.

COMB HONEY.

By S. D. HOUSE, CAMILLUS, N.Y.

It affords me much pleasure to meet with you; and when I say that after attending the Honey Show that is given in this city, I believe the exhibit to be the best I ever saw, I am saying only a little. (Applause.) You bee-keepers need not send over to New York State to get some bee-keeper to come over here and tell you how to produce honey, for you have as good producers in Ontario to-day as there are in the world.

Your worthy secretary has assigned to me the subject of "Comb Honey."

The subject is the broadest and most difficult, as well as the most important, pertaining to our favored pursuit.

The apiarist who produces comb honey, in order to obtain the best results, must be resourceful and capable. He should be a quick and keen observer. He must be intelligent enough to quickly adjust conditions and circumstances.

It is an undisputed fact that there are no established rules or methods that can be followed that would be applicable to every season or to every locality. What is one man's meat is another's poison. Methods that would be successful in one locality, would be disastrous in another.

In this latitude a change in the weather conditions often spoils our plans, and makes it necessary for a quick change in operations to meet existing conditions, or we will suffer reverses and loss, perhaps, of a part or all of our season's labor.

First of all then, every apiarist, and especially every comb honey producer, should select a favorable location. Such selection having been made, the bee-keeper should have absolute knowledge of the extent and resources from which he could derive the coveted nectar. He must learn at what times in the season the different bloom, or flora, will make its appearance, and then arrange his work and manipulations accordingly. Many keepers of bees labor under the false impression that all that is necessary is to put on the supers and the bees will do the rest. They cannot understand why they do not get as much surplus as the other fellow. It is hard to enlighten such bee-keepers, and to that class what I may say will be of little use.

You have heard of the odd sayings of bee-keepers of the old school, which might be applicable to this subject at this time. About all they seemed to know of the business was—"A swarm of bees in May is worth a load of hay; a swarm of bees in June a silver spoon; a swarm of bees in July is not worth a fly." Another one was, "No bees, no honey; no honey, no money."

In this age of apiculture, how true those axioms are. Are they not the real fundamental principles for successful honey production? I will take up those sayings to prove their truthfulness, and in doing so, will divide my subject into three parts. First, queens and bees; second, hives and manipulation; third, care and marketing of our products.

First, then, how shall we get the bees at the proper time to take advantage of the honey producing flora when it makes it appearance? In order to obtain the greatest number of bees, we must have young and prolific queens. This brings up to a point of breeding bees, and one of the most important factors in securing those strong colonies so much coveted. We must have a young queen, bred from a strain known to have great prolificness, whose progeny are good wax producers and honey gatherers. You have observed the great activity of a colony with a young queen; she seems to inspire the whole family with her vigor and youth for greater work. We have been breeding queens for half a century in a scientific way, and as a rule our queens are no better than fifty years ago. Why? Because we have bred more for color and purity of race than in selecting our breeding queens for endurance and prolificness, losing sight of the most important qualifications. In order to attain the greatest number of bees in a colony, we must control, or overcome the swarming impulse. Remember you can do a certain piece of work with a certain number of men in a given time much easier and quicker than you could with one-half the number of men. So with bees. A strong colony will produce more at the right time than two of half

the strength. With a young queen we have taken away most of the desire for swarming. Herein lies the secret of success. Do not lose sight of the fact that the older the queen, the greater the desire for the swarming impulse. This is in accordance with the laws of nature.

Starting with a young queen, the next important point is to keep that queen and her colony working to an advantage and to their utmost capacity. Commencing in the early part of April, we have the most critical point where we must exercise the most careful and best judgment in all of our manipulations during the entire season if we expect to be successful. A mistake at this time, or a failure to take advantage of every opportunity offered, greatly diminishes our chance of securing the much desired result.

We must manipulate our hives so as to generate and retain all the heat possible, by contracting the brood chamber to just that size that will keep the queen laying; enlarging it from time to time to keep her and her family busy, and at the same time not to subject them to a loss from sudden changes of the weather. This requires both good judgment and work.

Here is where the hive plays an important factor. Instead of manipulating our apiaries by brood frames and section holders we handle only hives, and parts of hives, and whole supers. By such manipulation, we reduce the cost of production to a minimum, an item that should not be lost sight of.

The most successful producer is the apiarist who secures the largest yield for the time and money expended. One man will handle 300 colonies against another's 100 colonies with the same labor and expense; therefore the hive is a primary adjunct.

The hives generally used are too large for securing the largest possible amount of comb honey according to the method I have adopted. While I advocate a large hive, I wish it to be understood that the hive in general use will not permit of practical adjustment of the brood chamber to conform with modern practice in producing comb honey, and I might say extracted honey.

To accomplish the desired result, I have adopted the devisable hive; not perpendicular, but horizontal; with shallow brood frames about five inches in depth; a movable bottom and top, and all made with perfect joints. In conjunction with this I desire to say that brood frames with heavy, or thick top bars and narrow spacing, is one of the causes for honey being stored in the brood chamber. The top bar should be not more than $\frac{7}{8}$ inches wide and not over $\frac{3}{8}$ inches thick, and spaced one-half inch apart, which will give a free communication above.

Right here I wish to call your attention to one point: never use soiled cloth covering over supers or the brood nest; it is unnecessary with closely fitted joints, and will obviate the use of propolis. When we do away with the cause for the use of propolis, there will be less of it gathered, and less traveled-stained honey.

With the divisible hive, which consists of two sections during the winter, I proceed from the first to the 10th April (in my locality) and examine each colony, and note their condition and the amount of stores on hand. I take away sealed honey from those having more than their requirements and give to those short of stores; contracting and adapting the brood chamber to the requirements of each colony. Unless on special occasions I do not open the hive again until fruit bloom appears. Then, by the use of perforated zinc, I find every queen and clip one of her wings. By this time, or perhaps before, my bees will need more room in the brood chamber. This is given by adding another section of the hive. I now have a large brood nest of worker cells built on comb foundation.

After fruit bloom has gone, we should stimulate until clover appears. In this condition they are allowed to increase in strength until about June 10th. By this time we have very strong colonies of bees which are ready for the honey flow, and we are prepared to give comb honey supers, when I proceed as follows: First, remove two sections of the brood chamber, or reduce the hive to one section; and with the use of the queen excluding zinc, we confine the queen to this smaller shallow brood nest, one that has the most sealed brood, and as little honey as possible, or an empty super frame filled with comb foundation.

We now add above the queen excluding division zinc, one or more comb honey supers filled with sections containing full sheets of comb foundation. Then shake or brush the greater part of the bees from the section of the brood chamber just removed, and place them upon a new stand, giving each one so placed a queen, or a ripe queen cell. After placing on new stands about one-third as many colonies as we intend to shake, we put on to each an excluding zinc. Now the brood that we shake is placed over those first set out on new stands. As the brood hatches, these combs above excluder are filled with honey, and no further attention is given them until after the white honey season is over, when these combs are extracted, and one section of empty combs given to each colony that has produced comb honey, that they may lay up their stores for winter. In about seven days after the colony has been shaken, add another comb honey super, repeating this as often as the honey flow will allow. The comb honey super should be raised about the time the bees commence sealing the honey, thus preventing it becoming soiled or travel stained. This brings us to a close of the honey harvest, unless you are in a locality where surplus is obtained from buckwheat, in which case place surplus super above the two sections of brood chamber. Comb honey should be removed from the bees by an "escape board," as soon as finished, and the supers tiered up, one above the other, as high as convenient, in a room with the temperature not below 70 degrees. From ten to fifteen days later it should be fumigated by the use of bisulphide of carbon. This is done by placing an empty super on top of tiers, using about one ounce of the carbon in a dish placed inside the empty super. Cover with a cloth and allow it to evaporate. Honey stored in this way will keep in perfect condition.

Great care should be taken in cleaning the sections and grading our comb honey.

Many large producers often lower the price of their product through poor judgment in grading and in carelessness in handling. Sections filled with combs that are to be carried over to the next season should be kept from the light and air, or they will not be fit for further use. I have found from experience that they *should not be used at all*, as honey stored in such combs will be only No. 2 at its best.

We should also unite upon a section of more uniform weight. As honey is being sold by the box more and more each season, present diversity of weight gives the consumer unequal value for his money, which causes dissatisfaction and retards consumption.

The sale of our product should be concentrated in the hands of honest, capable business men, which would enable us to maintain more uniform prices.

We should make use of every possible means to educate the people to the use of honey, and one of the best methods of attracting the public attention is an exhibition of honey; making it as attractive as possible. This must be done by the bee-keeper, not only at our fairs and national exhibi-

tions, but we should try to induce the wholesaler and retailer to make large displays in their windows that will attract the attention of the people and tempt their palate to such an extent that they would become purchasers at once. For an illustration: Last winter after I had given a talk at one of our public schools upon the anatomy and physiology of the honey bee, those students went home and said, "Oh, we must have some honey for supper." The result was that those school children bought every available box of comb honey in town, and there was not enough to go around. The grocerymen in town had purchased their usual winter supply and sold it all in about one hour's time. This is only one instance. We could make it a thousand. We as individuals, or local associations, cannot do it alone. But we should be united throughout the length and breadth of our land. The water that flows over the falls of Niagara only needed man's genius and energy to develop its wonderful power, and when confined and converted, at great expense, for a purpose, it became a profit to man. So with us if we combine our energy for a purpose, we could develop the honey market to an extent that would astonish bee-keepers as greatly as the powers of Niagara have astonished the world.

Wax production might be considered as pertaining to this subject, but as I have already taken up much of your valuable time, I will leave this question for a future time, or for others to discuss, along with the subject of comb honey production. I thank you for your kind attention, and hope I may have been the means of drawing out a thorough discussion of this all important subject.

Mr. ANGUISH: This plan as outlined in the paper we have just heard is mine right to a T. I work on the same principles and systems that he does. I know a good many who raise their comb honey by buying their sections and putting them on this year, letting the bees stain them, and carrying them over. These will be the first ones they put on next year. Mr. House says he does not want any of those. Neither do I. I carry over no sections. My frames are 6½ inches deep: Mr. House's are 5 inches.

Mr. HOLTERMANN: The system and lines along which Mr. House works are not mine in some respects. I visited Mr. House at his home twice. He understands his business, and he can back up all he says, right at his home.

Mr. CHRYSLER: Mr. House speaks of the importance of young queens. Is that of the present year's rearing?

Mr. HOUSE: Yes.

Mr. CHYSLER: I will endorse that.

Mr. LAING: Do you change the queens every year?

Mr. HOUSE: Yes. Some here would like to know how we get the young queens with this system; it is a very easy matter to raise and fertilize these young queens mostly in the hive where they are going to stay. Referring to giving an extra super at the time they need more honey, I would say, at the time there is a section of the hive of empty combs given the colony, place a queen excluding zinc between the two lower sections of your brood chamber and the queen cell in the lower section. The old queen is going on with work that will occupy her time for some days, and the young queen is becoming fertile and commencing to lay in the lower section. It is all done in the same hive and along the same lines. When you lift those cases away you have your young queen there all established ready for work.

Mr. LAING: I don't exactly see the necessity for having these queens one year old. Why not turn in half a dozen queens like Alexander has suggested. Couldn't they do the work?

Mr. HOLTERMANN: Has Mr. House any trouble with swarms when that cell hatches in the lower compartment?

Mr. HOUSE: No.

Mr. CHRYSLER: I had that same thing happen this year, and I had no swarms at all. I was just getting on to that line of work, I think it is the greatest thing, especially for comb honey, or probably extracted honey, too, that we have had.

Mr. HOUSE: Some eighteen years ago, or a trifle over that, we were producing queen cells in the same brood nest with a laying queen, and we did it with a division board of perforated zinc. We changed that queen over from one side to the other. We produced queen cells and cut out the queen cells. This was before we could artificially force them into building queen cells. When we got one side going we would change the queen over; and we were producing queens back and forth. You can do it in any hive by using perforated zinc.

Mr. MCEVOY: You have had two queens laying in the one hive at the same time with an excluder between?

Mr. HOUSE: Yes.

Mr. LAING: Do you mean to say they never get the swarming impulse under such conditions as those?

Mr. HOUSE: If they do they get rid of it some way.

Mr. CHRYSLER: That queen excluder I had, had an entrance to the upper story and the bees would go in that entrance and partly neglect the lower one. I thought that was one reason why they had no idea of swarming.

Mr. HOLTERMANN: You had that condition when the queens were below and no queens in the super?

Mr. CHRYSLER: The queens were above and the brood below; and they had an entrance below and one at the queen excluder where the queen was.

Mr. MCEVOY: Have you had two queens laying at one time?

Mr. CHRYSLER: Yes, I have had one old and one young queen.

Prof. SURFACE: I would like to ask Mr. House as to his treatment of unfinished sections?

Mr. HOUSE: We don't have any unfinished sections when we get through with the season. That is why I found it was not necessary to use any old bait combs. Force the bees to fill the section.

Mr. ANGUISH: That is the point. Have no unfinished sections. You want to look ahead far enough to try not have any. There may be seasons when you have them. We expect a flow of honey, and do not generally put them on till we know it is on. Take it when there is a four or five pound a day flow for a week or so, you can get your sections pretty well finished. If you do not you can pile them up on one or two or three or four colonies, and feed with some sort of a feeder from underneath. Liquefy your honey thin with water. You have then got a flow for a month or two months if you want it. That is the way to finish up unfinished sections. When the end of the flow is coming in sight we will take off the comb honey supers as soon as they are finished and put on the extracting supers again and finish out the balance of the season.

Mr. LAING: Do you do a little feeding back to finish those up?

Mr. HOUSE: I have done such a thing.

Mr. LAING: In feeding back I understand the custom is to thin the honey down a little bit. How do you handle that? What percentage of water?

Mr. HOUSE: The honey should be made about the consistency of nectar, about one-fifth water added.

Mr. ANGUISH: It is impossible to raise good comb honey on the deep frame; there is always a little rim of honey along the top bar; and with the shallow frame the brood is right up to the top. We do not want honey in the brood nest; we want all the brood right up to the top bar. When we get through in the fall of the year, if the honey season drops off short, we have got to resort to feeding. If we can get 25 cents a pound for comb honey, and can buy sugar to winter our bees on for 4½ cents, isn't there a little in it?

Mr. HOUSE: With these young prolific queens they will occupy these brood nests continually, and as long as the honey is coming you can leave those supers on. The very honey that you would get ordinarily in your brood chambers for winter stores they will put into that super and finish up your sections, and leave your colony minus of any honey whatever. Hundreds of them were stripped this summer, and they hadn't honey enough to live twenty-four hours; but we can buy sugar and feed for winter stores or feed honey back, if necessary. I consider sugar syrup better to winter upon.

Mr. ANGUISH: You do not want a big lot of wood for them to pass over to keep warm; you want a thin top bar.

Mr. CHRYSLER: I can do without a queen excluder if I have a ten-frame width instead of eight. I think I have an advantage there in the way of pollen being stored. It does not go up into the sections.

Mr. HOUSE: In producing 2,000 sections of comb honey this year all the sections that had pollen in went inside of one shipping case.

Mr. HOLTERMANN: Don't you think locality makes a difference on pollen.

Mr. HOUSE: I think not. I depend somewhat upon the queen excluder making a difference.

Mr. ANGUISH: I began hiving on starters, and when I was using them the bees would carry the pollen up into the comb honey. But since I have used full combs I don't think there will be a dozen sections of pollen in a thousand sections of honey.

Mr. HOUSE: You will get the same result by putting one empty comb in the centre and hiving the colony upon this and empty foundations sheets.

Mr. LAING: I would like to ask Mr. Anguish in reference to his combs in the brood nest. Do you take particular pains to get new combs or use combs that are two or three or four years old?

Mr. ANGUISH: I try to keep my combs as new as possible. I keep adding new combs as much as possible, and I keep drifting the older combs off into the extracting supers.

Mr. LAING: In the discussion of my paper they spoke of the soiling of the comb honey from the bees working on old black combs below, and you having had more experience than myself, I thought you would have noticed it very materially if it was right.

Mr. ANGUISH: When comb honey is produced, if it is not produced middling fast, they will stain it some anyway, even if it is new comb; they are travelling over the brood all the time, and they use the same cappings all the time.

Mr. HOUSE: This evening I have been requested to say something about the supers I use, and the separator. The separator is a wire cloth separator; it is the coming separator. It will soon be that you will not see a wood separator. The wire cloth separator has come to stay. It has been in New York State for twenty-three years. It is only mine by adoption. It was invented and patented by Mr. Betsinger, of Marcellus, a very ingenious man. This separator has this advantage over all other separators, namely, a free communication of bees and heat between the boxes. It is composed of wire cloth,

I should think about 1-18 inch wire, ¼ mesh. The separator is bound with tin on all sides, and on the upper side it projects so that it hangs into the grooves or rabbetts on the end of the super. On the lower corner the binder comes down and opens so that it forms a spacer. The sections go into broad frames that hang. Everything hangs—the section holder, the separator and all—and as the lasts section holder goes in that wedges them all. You can go up to your super at any time and there is no propolis sticking down that you need a crowbar or jacknife to raise it up. While you are getting up one of the old style separators I can go through 100 hives. This super has a longitudinal passage and the bees can go all around it; and all the bearings it has are the four points of the sharp edge of the tin as it bears against the separator and spacers. The sections have no bee-way. We can clean about five sections to the ordinary one. About a year ago the Root people spoke in their *Journal* about brace combs. We think so little about brace combs that we would not take the pains to heat a knife to cut them out.

Mr. ANGUISH: Have you section holders with wood underneath?

Mr. HOUSE: Yes.

Mr. ANGUISH: I don't use any. I have my sections come down to the bee space.

Mr. CHRYSLER: I raised 400 sections this year, and followed Mr. House's plan as near as possible with those separators; I believe they are ahead of anything I have tried. As regards sections being fastened to the separator with burr combs. I found that was altogether owing to the way the foundation was put in the sections. If it is loose in any way it will sway. I don't know what makes it sway. I fasten my foundation all the way round.

Mr. SIBBALD: How do you fasten your foundation into the section?

Mr. HOUSE: I have in years gone by used what we call the Daisy fastener. Never put your foundation in the boxes until they are ready to go on the bees that day. I have found it pays to do this. We make our sections, and put them in our frames and in our supers, and store them out of the way without any foundation. As the time comes along that we need these supers we take one of these broad frames out that have three sections. They are secured with a thumb screw at the back perfectly true, and are laid upon a little board. Then put in the foundation. Here at your side sits a little oil stove with a piece of tin upon a wood handle, that is very hot. Give it a downward motion about three times and the foundation is in. That is fastened on the top. I have tried putting in foundation in the bottom, but if you have colonies of the proper strength you need not bother with any lower foundation; they will bring it out to the wood all right. I allow nearly a quarter of an inch space below. I would not want a full sheet; there is a little gain.

Mr. GRAINGER: What about the side?

Mr. HOUSE: Most of my foundation has been about one-sixteenth narrower than the box.

Mr. MCEVOY: What about wax?

Mr. HOUSE: I want the foundation as it comes from the mill. I don't want any kiln-dried foundation for the hive. That is soft foundation.

Mr. SIBBALD: I have found that very true. The bees do not like foundation that has been put in the sections and stood in the air a long while. They reject it.

Mr. GRAINGER: I heard it stated at a convention some time ago that although foundation might be a year old, by warming it up or steaming it it could be made as good as ever.

Mr. House: Foundation that becomes hardened from exposure to the atmosphere can be dipped in hot water at about 130 degrees temperature; and you must go to the pains of drying it again and packing it up, but you can make it pliable.

Mr. McEvoy: How do you fasten foundation in section boxes.

Mr. Anguish: I fasten mine about the same as Mr. House does, but on three sides. He is running 500 colonies and we are running about 200.

Mr. Newton: Every bee-keeper will say that the bees work more readily on the new foundation.

Mr. McEvoy: I have used both white and yellow wax, and I don't like the yellow.

Mr. Newton: When you are showing at Fairs, I believe the section honey looks nicer, if we can hold it up to the light and it has white wax in the section.

Mr. Anguish: What are we showing at the Fairs for? Does nobody use that honey after we get through with it? We have somewhere about 5,000 pounds of section honey, it is all made on white wax. We have only shown a few dozen. What are we going to do with the rest? I want the very best of everything I can get. There is nothing too good for the people that eat the honey.

Mr. House: I don't know what people mean by having dark wax in section boxes. I have been very fortunate in my operations. I have never experienced any of that. You take any pure yellow beeswax, and when the bees get through with it and are filling out comb with it, it is white. If it is not, you have got something that is not beeswax.

Mr. Sibbald: I noticed one point in the early part of Mr. House's paper that was not criticised, and which I thought was a very good point. Some people say they use one certain method and some say they use another certain method and so on. Mr. House brought out the thought that we ought to adapt ourselves to circumstances, and be able to size up the season and the condition of the bees, and then adapt a system that would work all right for that season. The system that works this season might not be the system that would work as well next season. You have got to be ready to work to get the very best results from what you have got. That is a point I was pleased to hear him bring out. I think it would be well for bee-keepers to remember it.

A young queen is a splendid thing for comb honey, and the way he raises those queens is another splendid idea. I believe it will be a great success.

BEES AND THEIR RELATION TO HORTICULTURE.

By Prof. H. A. Surface of Harrisburg, Pa.

It is to me a great pleasure always to meet with persons practically interested in subjects which I am trying to study, both from a theoretical and practical standpoint. It has been too long, indeed, that practical men and so-called scientific or theoretical men have stood aloof one from the other. The theoretical scientist needs the aid of the practical man to put him straight. Theory that cannot stand the test of practice is not very stable or accurate, and is not very good science; it is pseudo science or false science. In this day of advanced thought and study and educational methods, we are where the practical man cannot make progress without reaching forth his right hand to join the right hand of the scientific man and make use of

scientific principles. Our laboratories prove that instead of the scientist working as did the old alchemist, simply to change the colors of substances, he is working towards a definite end; and so with agriculture, in all its branches, apiculture being one of the minor branches. The practical man is becoming to some extent a scientist. You talk about your queen breeding, about the development of your apiaries, and the selection of your stock, and in doing so you are applying the very principles of advanced stock breeding. Along that line, were I to present a discussion of apiarial improvement, I should insist upon one point which the bee-keeper has apparently overlooked to a great extent. In the breeding of live stock those who are making a specialty of cattle, sheep, hogs, horses and even poultry, give great stress to the importance of the male ancestor in breeding. In fact our cattle breeders lay more stress upon the importance of the male, and the parentage and lineage of the male, than of the female. The horse breeder does the same. How has it been with the bee-keeper? We have thought a good deal about the ancestry of the queen, about the race and the strain, etc., and very little has been said of select drones. Why? Simply because we know the queen mates when flying high in the air, and it is possible to control the parentage of the queen without so readily controlling the parentage of the drone. But nevertheless, what one can do in his apiary is to prevent drones being reared from those hives or colonies that are not as profitable or advantageous or meritorious hives, and in that way he can produce a select strain of drone cells and a select queen.

Now, my experience as a practical bee-keeper has been considerably limited, and I believe from what I see here that were I to present my paper upon "Home Apiary Improvement and Honey Production" I should not be doing the subject the justice that one of your own bee-keepers could do it. I have brought, therefore, a paper upon the subject of bees and horticulture, and it may be I can, through the *Bee Journal,* if desired, publish one upon "Apiary Improvement." With your permission I should prefer to change my subject to that of "Bees and Horticulture," because this is directly in the line of my profession. I have been a student of this subject for practically all my life. I feel more at home in talking upon this than upon the subject of "Apiary Improvement" to expert bee-keepers. Were I speaking to amateurs my attitude would be different.

In attempting to discuss this subject we realize that it is one of the most time-honored among bee-keepers and fruit growers, and that it has been threshed over and over again in journals and meetings devoted to the interests of persons engaged in such pursuits. However, there is sometimes justification in revolving old subjects under a new light to see if perhaps an additional point concerning it can be gained. The very antiquity of the subject indicates its importance, and if anything whatever new can be added, or anything in doubt can be cleared up, and the truth emphasized, we shall be justified in again turning discussion toward the old topic. If something really new be desired, we should be glad to discuss such subjects as "The Bee Sting Cure for Rheumatism," which must no longer be regarded as a joke, but in line of recent developments becomes a reality; or it might be possible to take up the subject of some unsolved problems, such as "The Effects upon the Human System of Continued Stinging by Bees," "The Results of Rearing Bees in Cells of Different Sizes or Shapes," "The Probability of Spontaneous Production of Wax Flakes and Consequent Loss of Honey by this Transformation when Drawn Comb is used for Storage and the Wax Flakes can not be Utilized," "Multiple Queens," and other topics that may be of more or less practical or scientific interest to bee-keepers.

In discussing the subject of "Bees and Their Relation to Horticulture," we shall refrain from touching the now well-established fact of the definite relationship between bee and flower, the necessity of the bee to obtain both nectar and pollen from the blossom, its wonderful adaptations of structure as shown in the nectar sac and pollen baskets, especially fitted for their purposes, or, on the other hand, the dependency of the blossom upon the bee for the carrying of the pollen grains from stamen to pistil, particularly in going from one flower to another, so essential in cross fertilization and the setting of roots. However, concerning the last point, we may pause long enough to say that this year we have evidence that the general shortage of the plum crop was due to the very cold weather of the spring time, when the plum trees were in blossom, but the bees did not fly. It is possible that the reduced pear crop over the country may be due to a similar cause; but this can not be true of the apple crop, and we know where there was a magnificent yield of apples, in some regions of Pennsylvania, from blossoms that were expanded when it was too cool for bees to fly, and from our own observations we believe that many of the apple trees laden with fruit in the fall of this year were not visited by a bee or other pollenizing insect during the time of their blossoming in the unusually cool spring. We must acknowledge that while in Nature there are most beautiful structures and adaptations, such as the color, form and products of the blossom, to attract and sustain the bee, and pollen sacks, and numerous hairs for the carrying of pollen, as well as nectar sacks for carrying liquids by the bees yet the full relationship of insects and flowers has not been demonstrated by practical test of trees and plants of different kinds, definitely covered with gauze or very thin netting in such a way as to permit the natural vital functions of the plants to take place, with the possibility of wind fertilization, but excluding pollenizing insects entirely from the trees or plants of different kinds. Such studies could be well made by our Experiment Stations, and would no doubt reveal the fact that some kinds, like plums are more dependent upon the bees than are others, like the apples. The student of nature constantly meets so many beautiful and wonderful facts and conditions that he may possibly fail to appreciate their full significance, but occasionally in the contemplation of such things he is forced to pause and exclaim with the poet Young:

"No more the misty vale of doubt I trod,
My reason saw, my Soul confessed a God."

In this following discussion I wish to place emphasis upon the three following points: (1) Bees will not be killed by proper spraying methods; (2) Bees do not and can not puncture fruits: (3) Bees are not to be condemned for carrying the germs of pear blight. These I shall discuss in detail.

(1) Bees and Spraying. This subject has been discussed to such an extent that we should consider it fairly well settled, were it not for the fact that frequently articles appear in the papers and are circulated over the country, conveying the information that bees have been killed by spraying, and even in some cases going so far as to say that honey has been poisoned by the use of spray liquids containing poison carried to the hives by the industrious workers. In passing, we wish to pause only long enough to go on record as having said that we consider the production of poisoned honey from sprayed plants as an impossibility, and such a suggestion an injustice to the producer and also to the consumer of the most delicious of human foods.

While it is now generally recognized that spraying blossoms is such bad horticultural practice from the standpoint of the fruit producer, that it is not followed; and consequently the danger of killing bees at such time has

passed away, we have a new hoax to be found in the statement which has received extensive circulation during the past spring to the effect that spraying for the San José Scale has killed bees. It appears constantly that either some bee-keeper is to be disgruntled over modern horticultural practices, or some fruit grower is anxious to assume a position of enmity toward a bee-keeper for some fancied wrong by bees. This is like a farmer who must necessarily find cause for complaint. It must first be poor crops, but when these yield more, he then complains of low prices; but when crops are good and prices are high, as during the present year, he still finds solace in being miserable over the fact that, "It takes lots of work to harvest and market such crops, and besides it's awfully hard on the ground." (Laughter.)

The following article was extensively circulated in the papers of Pennsylvania during the past spring:

TREE SPRAYING KILLS BEES.

THOUSANDS OF INSECT HONEY HUNTERS DIE FROM SIPPING POISON.

Tree spraying for the San José Scale now being conducted at the instance of the State Agricultural Department has aroused the displeasure of the keepers of bees in the vicinity of Norristown, owing to the havoc it has created by killing thousands of these honey gatherers. Probably the heaviest loser is John C. Detwiler, in Whitemarsh, who says that his bees have died by the thousands since the trees in the neighborhood have been sprayed.

Mr. Detwiler says: "Bees require large quantities of water, especially at this season, and will obtain it from almost any blossom or wherever possible. This water is then mixed with the pollen in process of keeping the hive. At present bees are feasting upon the opening blossoms, and almost as soon as they sip therefrom, the trees of which have been sprayed for the extirpation of the San José Scale, they become affected by the poiosonous liquid and speedily die."

To this we felt obliged to reply as follows:

BEES AND TREE SPRAYING.

STATE ZOOLOGIST SAYS SULPHUR WASH KILLS THE SCALE BUT NOT THE BEES.

My attention has been called to a newspaper article entitled "Tree Spraying Kills Bees," and I beg to write concerning the error in this, as it is an injustice to the men who may wish to save their trees from the terrible San José Scale. In the first place, the spray for the San José Scale must be applied before the trees are in bloom, and our inspectors and demonstrators have never sprayed any trees while in blossom in order to kill any scale insects; therefore there would be no honey bees around the trees sprayed for San José Scale at the time the spraying was done. The lime-sulphur wash is caustic, but it is not a "poisonous liquid." Bees could not be induced to sip it, and if they should do so they would not be killed by it, as they would by an arsenical poison.

The bees around Norristown, as elsewhere in this state, may be dying from foul brood or a trouble sometimes called "spring dwindling," but they certainly are not killed from the effect of any spray used or recommended by this office for San José Scale.

May I take this occasion also to call the attention of the public to the fact that we do not spray blossoms for any pest known. In other words, no trees should be sprayed while in bloom. Spraying at such times with arsenical poison may have the effect of killing bees, but the lime-sulphur wash is not an arsenical poison, and is not sprayed while the trees are in bloom, and therefore bees are not killed by any spray used for this purpose.

H. A. SURFACE,
Economic Zoologist of Pennsylvania.

For San José Scale, fruit growers may use oils, soaps, or caustic washes, such as the lime-sulphur wash, which we consider best and cheapest. The bees would not touch the soap solutions nor oil substances. We have had a kettle of the lime-sulphur wash standing near our bee hives for weeks, and not one bee has been seen to attempt to drink it nor have any been killed by

it. We have sprayed bushes and trees around and over the hives during the past year, and have had the hives covered with the spray in an experimental orchard, two or three different times, to such an extent that they were yellow in color, and the liquid dripped from them. None of the bees were killed by the process excepting those that were accidentally injured while actually in the act of flying through the cloud of mist or spray as it left the nozzle. A few of these may have been killed, but if so it was only by external contact and not by their voluntary sipping the liquid.

It is to be remembered that in making such a statement a professional naturalist values his own scientific reputation too highly to permit himself to make an error that can be avoided either by practical test or by careful study. We are certain that bees have not been killed by spraying trees before they blossom, and no one sprays for the San José Scale after the buds burst. In general, no fruit grower, who knows how, when, and why to spray ever sprays anything while the blossoms are open, and this is the only chance by which bees could be killed, excepting in the rare conditions of bees being quite thirsty and deprived of their natural water, sipping a little spray liquid from the leaves where it may remain for a short time after spraying for the codling moth or leaf-eating insects later in the season.

Emphasis should be made of the fact that the Bordeaux Mixture is not an insecticide, would not kill bees nor other insects, and is used only as a fungicide or preventive of certain plant diseases. If, however, Paris Green or some other arsenical poison, such as London Purple or Arsenate of Lead, were added to the Bordeaux Mixture or used as a spray, and the bees could be induced to sip the liquid through its falling into widely opened nectar-yielding blossoms, or through excessive thirst of the bees, sipping it from the leaves where it temporarily remains, it is possible that these beneficial insects might be killed by such means and at such times. However, it is my opinion that if water be placed in the apiary regularly, as it should be, the bees will learn to go to it, and will not seek the crops of poisoned spray liquid that may remain temporarily on the leaves in spraying for the codling moth. Finally, on this particular point it may be said that the codling moth is the only pest for which arsenical sprays are recommended as a regular annual practice, and for it the spraying should be done soon after the petals fall, and again within a week or ten days. But few bees are flying in the tree tops at such time.

Though it is fairly well known that bees do not puncture fruits, yet further observations and proofs are needed to convince some persons on this point. Not long ago a friend reported to us that our bees were puncturing and destroying his grapes. I sent an assistant to investigate this and he reported to me that the bees were in the grapes, but were sipping the juices only of those of which the skin was punctured, either by the Grape-berry moth, the Curculio, Yellow Jackets, or the Brown Rot germ. They are unable to break or puncture the skin of grapes of their own accord.

Last summer I found a few bees sucking the juices and removing the pulp from beneath the skins of plums hanging from a tree over their hives T test the ability of the bees to work at very small punctures and make punctures for themselves, I placed six plums on an old pan and set this on the frames in the top of the hive. I here exhibit the same after it had remained there nearly two months, and in fact was taken from the hive no earlier than the thirtieth day of last month. The two plums marked "A" were starting to decay with Monillia or Brown Rot; the two marked "B" were sound and ripe and were placed on the pan with their skins unbroken; the two marked "C" were merely punctured with four or five direct pricks

of a pin in each. It can be seen that the bees removed the juices and pulp of the last pair because they could find working points at the punctured places; but the second pair, or the unpunctured fruit, simply dried like prunes, without the skin having been broken by the insects, and with the pulp left in place. The first pair, or those starting to decay, received some attention from the bees; but in my opinion they worked only upon that part of the fruit which had not yet decayed, finding their entrance in the skin at the edge of the decayed area. An examination of the reverse side of this plan shows the propolis, which plainly indicates that it has been for some time on the frames of the hive. May we not accept this as one of the evidences that bees do not cause the original injury to fruits which they visit?

Concerning bees carrying the serious and deadly germs of Pear Blight, I wish to establish this that Pear Blight often appears without the intervention of bees, and that as these are not by any means the sole agents culpable for the dissemination of such germs, the pear growers are not justified in condemning the bee and desiring to exclude it from their orchards. We know that such action has been contemplated, as I was recently told of it and of the effort made by some fruit growers in California to condemn and prohibit the keeping of bees near their pear trees, because they presumed these insects were the agents responsible for the spread of the Pear Blight. Mr. E. R. Root, of Medina, Ohio, went with them through their orchards, and showed them ants and other insects present in numbers upon the trees. He convinced them of the possibility of the Blight germs being conveyed by these other agencies, and hence the impossibility of preventing its spread should all the bees be excluded from their orchards.

An illustration of my meaning in this regard is to be found in the attitude of some fruit growers toward the Robin Redbreast or American Robin. Some persons have raised a cry against this bird, demanding legislative proceedings for its destruction, because they claim that it carries upon its feet the deadly San José Scale, so destructive to most fruits. The facts are that the San José Scale is carried or disseminated by eight or ten other means besides upon the feet of birds, and in the last-named agency the English Sparrow is far more effective as an agent in the dissemination of the San José Scale than is the Robin. In fact, any bird that would alight in a tree, infested with this scale insect in its young and free-moving stage would be liable to carry the young pests upon its feet to any other place to which it might fly. The robin is only one of the known agencies in spreading the scale, this pest being carried by so many other means, so that the cry against it for such reason is not justified; and the spread of the scale would be practically as rapid and extensive were all the robins destroyed in accordance with the demands made by a few fruit growers. Likewise, Pear Blight is disseminated by so many methods besides bees, that no one is justified in making complaint against the bee on this account. In fact, it is not definitely proven that the Honey Bee does disseminate the germs of this deadly bacterial disease, and on the other hand it is known that the disease may kill trees under conditions which prohibit the intervention of the honey bee. For example, this spring I planted an orchard of young pear trees late in the spring, when the weather was so cool that bees were not flying. Also, of course, the trees just set out contained no blossoms, and I saw no signs of exuding juices or sap. Thus it was certain that there was nothing to attract the bees to them, and I am convinced that no bees were near these young trees. However, within a short time after planting the trees, they commenced to show signs of being infected with blight, and the disease spread

over the trees and finally killed many of them. It was probably carried to them by an infected pruning knife in trimming the branches, or by the wind, or by some other means, even in the nursery before they were shipped. Thus we see that the condemnation of the bee in such case is entirely unjust. Let us unite to study and disseminate a knowledge of the truth, and if possible add new points occasionally to such an important though time-honored subject as "Bees and Horticulture," and thus we may feel justified in our efforts.

Mr. DICKENSON: There is one thing I would like to emphasize in connection with putting a trough of water in an orchard. I think it is very important. It saves trouble and annoyance in regard to bees going for water. A little salt in the trough is a good thing to tempt them. If they get started they go pretty regularly and in great numbers.

Mr. LAING: What is the general medium for fertilization of apple blossoms?

Prof. SURFACE: I think in many cases apple blossoms are self fertile; in others they are not. It may be any of the flying insects; it may in some cases possibly be the wind, but we know the majority of the varieties are self fertile. However, I would not recommend planting more than six rows of apples of any one kind; then plant six of another kind. If I wanted to plant twelve acres of apples of four kinds, I would plant them in that way to ensure this cross fertilization and setting of the fruit.

Mr. HOLTERMANN: Do you think the seasons make any difference? It seems to me that there are seasons when the bees would be the means of giving a much heavier yield for certain things, if they were in the vicinity, than there would be if they were not.

Prof. SURFACE: They undoubtedly have their influence, especially upon some kinds of blossoms. I had 76 colonies in my apiary near an apple orchard, and when the trees were in blossom I saw no bees working upon them, and yet we had in our vicinity a magnificent apple crop. So that we cannot say it was due this year to the bees. Yet, we had a short crop in pears and plums, and I expect the shortage in the plum crop was very largely due to the absence of the bees.

Mr. HURLEY: I have noticed in the early spring when the maple buds opened up, the bees gathered pollen from them. Is it possible that bees gather pollen from apple or other fruit trees immediately after the buds open before the blossoms appear? If so, will not the early spraying possibly hurt the bees?

Prof. SURFACE: That is not possible until the petals are expanded. The spraying for scale insects is done before the blossoms expand, and for the codling moth after the petals fall. Those spraying liquids would not come in contact with what are called the essential organs of the flowers. However, there is one important thing concerning the gathering of pollen by the bee. In order that nature may prevent the full effects of in-breeding in plant life, flowers are so arranged in many cases that they produce pollen before the time when their own pistil is ready to receive pollen; or, on the other hand, the pollen of that flower may be produced after its own pistil has received pollen, and thus prevent cross-fertilization, its pollen being carried to a receptive pistil in another flower. Bees do visit many flowers for the express purpose of gathering pollen. I know they have gathered pollen from the blades of my sweet corn. I should like to see considerable study made, not only of the honey-producing plants, but of the pollen-producing plants. That is a subject we have hardly given any study to. I said we sprayed for the San José Scale before the bud bursts. I mean before the

winter resting buds swell, but I did not mean flower blossoms. For San José Scale we spray before the first green leaf peeps through its bud. The next spray would be for the Codling Moth after the petals fall. Those flowers are not open or exposed at the time of the first spraying, and they have passed their period of blooming at the time of the next spraying.

Mr. DICKENSON: I think we are perfectly safe in spraying the apple blossom before it bursts. You can let it go pretty close to the time it is ready to burst. I have made a practice of spraying before the apple blossom comes out in my orchard. I put a pound of Paris Green to a barrel of water; that is four times more than the regular allowance, and I have had 150 colonies in my orchard, and had no evil results and never saw anything dangerous at all from that spraying. That is spraying for the codling moth.

Mr. MCEVOY: In this country they do not spray any more while the trees are in bloom. These people who find a lot of dead brood in the hive say it is from the spraying, but it is the bee-keeper that is making the mistake as a rule and not the fruit man.

ARTICLES ON HORTICULTURE.

The following four articles have already appeared in the report of the Fruit Growers' Association for the current year, which report is sent only to members of the Fruit Growers' Association, and those particularly interested in fruit growing. They are reprinted herein because they are thought to be sufficiently general in their scope to be of interest and value to practically all farmers in the Province.

COMMERCIAL FRUIT GROWING IN WESTERN NEW YORK.

By WILLARD HOPKINS, YOUNGSTOWN, N.Y.

The subject of commercial fruit growing in Western New York will be confined principally to the Niagara Frontier and to our own personal experience. Living as I do on the banks of the Niagara River, where our principal orchards are located, and owning a fruit farm on the Canadian side of the river, I feel a personal interest in the prosperity of the fruit growing interests of Canada as well.

About thirty years since, I began planting commercial orchards, and have continued to plant and re-plant ever since until we have now upwards of 300 acres under cultivation, consisting of apples, pears, quinces, plums, prunes, peaches, and cherries, and, beginning with the latter, we have almost a continuous gathering of fruit until the last of the apples are harvested. We have trolley cars running through the orchard with New York Central connection, so that we can ship to any part of the country. In planting the eighty acres of apple orchard thirty years ago, I made the error of planting almost exclusively the late bearing varieties, Baldwin and Greening, consequently had to wait twenty years for a remunerative crop; while, if I had planted Duchess, Hubbardston, Wealthy, and other early bearing varieties, I should have gotten returns in less than half the time. The quince orchard of about 1,200 trees, planted thirty-five years since, has borne crops almost yearly since six years old, and the present year gave us over 400 barrels, selling for $1,500. It has been necessary to

spray them at least three times through the season to prevent black spot on leaf and fruit. The soil is a dark surface and heavy clay subsoil. Have scarcely used any fertilizer on this orchard.

We have about 10,000 pear trees growing, principally Bartlett, Kieffer, and Duchess, of various ages, and often gather 3,000 barrels of fruit, which is taken readily by home and export trade. The Bartletts usually go into cold storage within twenty-four hours after gathering. Well do I remember before the advent of cold storage for Bartlett pears, when the ordinary life of the fruit was about a week after gathering, seeing selected Bartletts offered on the Buffalo markets for 75c per barrel. Now, with the present facilities for handling them, we get from three to five dollars per barrel.

We endeavor to give our pear orchard clean cultivation and spray them two or three times with Bordeaux mixture. We try to go through the orchards once in ten days and cut out the blight in seasons when it is bad. Our plums are principally Niagara, Lombard, Coe's Golden Drop, and prunes of the Fellenberg variety. We never fail in having a crop of some variety and frequently of all varieties. The plums are largely used by local canning factories and the prunes go to Pittsburg, New York, and Philadelphia. They also are given two or three sprays of Bordeaux. In our early experience with prunes, they would make quite a growth up to the last of July; then the fungus would ruin the leaves, which would drop, and then start a new set of leaves in September, and the trees would go into the winter in bad shape. Since spraying, they and the Lombard plums carry a rank foliage all through the season.

A portion of the land occupied by our peach orchard of twenty acres has been growing peaches for the past seventy years with scarcely any time elapsing between the removing of the old orchard and the planting of the new one. Nine years ago we removed an old orchard, principally Early Crawford, that was badly infested with the yellows and small peach. We cultivated the land one year, and the following spring planted it to Reeve's Favorite, Elberta, and Late Crawford, and it has borne abundantly for five consecutive years. The sales from this orchard of 20 acres the present year realized upwards of $9,000, exclusive of packages or commission. This orchard, now eight years planted, was examined by government inspectors who found less than twenty trees with yellows or small peach.

We endeavor to keep our peach trees headed back so that they can be picked from a six foot ladder. One cannot be too careful in selecting varieties for planting. Take the Longhurst or Hill's Chili for instance, which succeeds well on warm early land; on ordinary land it is absolutely worthless. The Late Crawford and some other varieties which succeed so well with us, on the lake shore are subject to fungus troubles and are often shy bearers. In planting peaches, as well as other fruits, study your locality and conditions well, and get the benefit of others successes and failures. Fruit growers have no secrets. We are always willing to give away any information we have no matter how expensive it has been to us to secure. Within three miles of this orchard on either side of the river there are a number of farms of 100 acres each, portions of which are well adapted to peach growing, where the sales from the entire farm would not amount to the returns from an individual acre of this orchard, and the owners are living principally upon scenery. About four years ago the San José Scale appeared in our orchards, coming from an infestation in Niagara-on-the Lake, four miles away. They thought it had been carried by birds, particularly crows, which made nests in our large apple orchards. At first we received very little practical assistance from our experimental stations either

at home or in Canada. I often think of the crude way your inspectors and experimenters, Messrs. Fisher and Healey, were preparing the sulphur, lime and salt wash on a cold day in the last of March in an old iron kettle, and testing the effects of it on a few trees in the garden, and we concluded that if we had to apply that preparation to our 300 acres of orchard, we would surrender. But we established an experiment station of our own, using whale oil soap, sulphur and lime, and crude oil emulsion, and have got to using P.A. crude oil on our large apple orchards, put on just as the buds open, with the finest nozzle. This treatment we recommend as a last resort when the trees have been badly neglected. Ordinarily, we find crude oil emulsion prepared by putting 30 or 40 gallons of water in spraying tank, then put in 12 or 15 lbs. of whale oil or other soap and boil until soap is all dissolved, then pump 50 gallons of oil into the tank keeping the steam turned into the tank all the time, then fill tank to 200 gallons, keeping agitation going all the time. We use this emulsion one year, and if not comparatively free from scale, follow it the second year with sulphur and lime. We removed the upper storey from our 50 year old apple orchard, and now find comparatively little difficulty in reaching the tops of the trees with the spray, standing on an elevated platform on the wagon. I now show you a sample of fruit taken from this orchard, which three years ago was so badly infested with scale that the trees were dying and the fruit was only fit for the cider mill or dryer. The fruit is comparatively clean, and we had the satisfaction of selling it for $3 and $3.50 per barrel this season. We use sulphur and lime on our peaches, pears, and most varieties of plums and prunes. In our various orchards we have three, eight or ten horse-power boilers, with elevated vats, for cooking the sulphur and lime and the emulsion, and use four power sprayers and two hand sprayers. With modern means of applying these remedies, is it not surprising that hundreds and thousands of acres of apple orchards in Western New York, and in Canada between Hamilton and the Niagara River, are being abandoned, and in many districts you have scarcely enough apples to supply home demand and the canning factories, let alone any for export. There has always been great fear among small fruit growers that soon there would be an over-production and no remunerative market, like in 1896 when fine apples sold from 50c to 75c per barrel, and other fruits in proportion. Now this San José Scale should allay our fears on that score. While orchards that are infested with all other pests may survive and be reasonably productive with careless or no cultivation or spraying for years, these untreated, scaly orchards are fit for the brush pile in from two to five years. You might as well hope to grow potatoes without spraying to eradicate blight and potato bugs as to think of growing a high class fruit without the use of spraying in a scale infested district. Such person had better quit the business, or what is better still, never go into it.

This general distribution of the scale through Canada and the States has been brought about by planting unfumigated nursery stock. Prof. L. O. Howard, of our Department of Agriculture, tells us that, in spite of the wide dissemination of scaly fruit in this country and to some extent abroad, there is not a single authenticated instance of the scale having been established from such fruit. In one of our old Greening apple orchards, the scale had killed most of the ends of limbs. We cut it back to within three or four feet of the trunk two years ago, and we now have a vigorous top, low down, and hope for good results. The same is true of our peach trees where cut back on account of scale. They have grown fine tops and are bearing excellent fruit equal to young trees.

The great question is, does fruit growing pay? When I see young men in our fruit growing districts leaving the farms for work in the shops, on the railroads, and many of the professions, for the great wheat growing districts of the Northwest, or chasing the will-o'-the-wisp to gold and silver fields, like the Klondike and the Cobalt, and overlooking the golden opportunities right at home, I think something must be radically wrong. The old-fashioned happy-go-lucky manner of fruit raising does not afford sufficient remuneration to keep the boys on the farm, while I could cite you hundreds and thousands of instances where small farms of 100 acres in Western New York between Genesee and Niagara Rivers, with only a portion of them in fruit, have earned for the owners a competency producing, in single years, five, ten and even fifteen thousand dollars.

I recall an instance of a young man buying six years ago a 100 acre farm for $7,500, with 30 acres of fruit. It was paid for in four years, and this year he received $7,000 for the fruit on the trees from his 20 acre apple orchard; while another orchard of equal age and size within one-half mile gave as many hundred dollars. The scale and codling moth took the one, and sulphur and lime and Bordeaux took the scale and codling moth in the other. Another instance where a young man a year ago bought a fruit farm of 140 acres for $25,000, having $5,000 capital, and his sales this year realized over $15,000 from this farm. I could cite you, too, instance after instance where neglected fruit farms were bought and paid for in a short time by up-to-date young men.

The fruit growers' life sems to me very much to be preferred to that of a clerkship, even in a Government office, or an ordinary profession. Where is there a more delightful spot for a home than in your Niagara Peninsula or in Western New York? Instead of having to send our products thousands of miles to market, paying often three or four hundred dollars per car, we are within twenty-four hours' ride of forty million hungry people.

In conclusion, I would say I have no regrets that I selected fruit growing as a calling. After all its vicissitudes, when, four or five years ago if seemed as if the scale would ruin all our orchards, it seems like getting back what I thought was lost. Although the present season was unfavorable for many varieties of fruits, we were gratified to receive from the sales from our home farm upwards of $20,000, and from all our orchards upwards of $26,000. After deducting the amount paid for help, spraying, material, and machinery, we have a nice bank account to winter on.

The Globe Peach appears to have a very delicate skin and is a shy bearer. This year the fruit did not nearly mature, while alongside these trees other varieties bore so that we had to prop them up. This peach is really the only failure we have had.

As to the use of crude oil, it is a very dangerous treatment unless used with skill and care. I know of an instance of a man (you might call him an unprogressive farmer as he never attends our farmers' clubs or reads our bulletins), who heard somewhere that crude oil would clean out the scale. He bought a few barrels, but not knowing that a special nozzle was necessary, he used his old Bordeaux nozzle and gave the trees a good drenching. He was surprised to find soon after that his trees had lost all their folliage, and it took them some time to recover it. If it had been used in a practical way with the finest kind of nozzle, he would probably have had excellent results. That has been our experience.

In our apple orchard we leave a strip of grass six or eight feet wide between the trees so that we can drive over the land in the spring with our heavy sprayers. We get very high color, noticeable particularly with our Baldwin apples; even the small fruit bears this high color.

Q.—Have you used any of the commercial spraying preparations?

A.—We have never taken any stock in Scalecide and other preparations, which are designed to make money out of us poor fruit growers.

Q.—Have you ever used the wheel-power sprayer?

A.—It is all right for small orchards of from 15 to 20 acres. It seems to me it is better if anyone wants to purchase a gasoline spraying outfit, for three or four neighbors to have a kind of a stock company. The only objection to that is that everyone may need to spray at the same time, but that can be arranged better than to undertake to work an inferior outfit.

Q.—At what pressure do you run your power sprayer?

A.—We make it according to the height of the trees.

Q.—What horse power engine do you use?

A.—About 2½ or 3 horse power. We have a number of engines, using them for cutting feed, sawing wood, etc.

HORTICULTURAL DEVELOPMENT IN ONTARIO.

By Prof. H. L. Hutt, Ontario Agricultural College, Guelph.

The wonderful progress that has been made in the various branches of horticulture in this Province during the past decade is something that very few fully realize. I wish to call attention to a few points in this connection, for it is by considering the progress in the past that we come to an understanding of our present position, and are able to form some idea of the outlook for the future.

Horticultural development in Ontario has been characterized of late years by specialization, organization, and co-operation. No doubt the rapid progress of late has been brought about largely by specialization and co-operation, and the results already attained certainly augur well for the future.

As an indication of the recent progress let me call your attention to the numerous and varied horticultural organizations we now have in Ontario, most of which have been organized within the past ten or twelve years.

In fruit growing, besides our Provincial Fruit Growers' Association, which was about the only horticultural organization heard of about ten or twelve years ago, we have a number of local organizations in the large fruit centres. Then we have another Provincial organization, the Co-operative Fruit Growers' of Ontario, and about forty local co-operative associations, actively engaged in the handling and marketing of the fruit crop, or in all about fifty organizations under the head of fruit growing.

Then we have the Ontario Vegetable Growers' Association, another Provincial organization, and about twenty-five local vegetable growers' associations organized within the past two or three years.

In floriculture we have what is called the Canadian Horticultural Association, an association made up largely of the commercial florists of Ontario, who also have local organizations in some of the largest centres of the trade, as they have here in Toronto.

These associations are all made up of those more or less commercially engaged in one or more of the branches of horticulture. Then there are the amateur horticulturists with their Provincial organization and sixty-six local Horticultural Societies in various parts of the Province. In all about one hundred and fifty purely horticultural organizations.

There is not another Province in the Dominion nor a State in the Union that can compare with Ontario for completeness of organization. Does not all of this indicate that our people are becoming alive to their own best interests, and are uniting so that by mutual co-operation they may make still more progress in the future? I firmly believe that because of such organization and co-operation the progress of the next ten years will be many times that of the past ten.

I regret that as yet we have not full or reliable statistics as to the status of these varied industries. Both the Provincial and Federal Governments are considering the problem of getting such statistics, and I trust that before long these figures will be available. The fruit statistics presented by Mr. A. W. Peart at the last Dominion Conference of Fruit Growers gave us a little idea of the value of the fruit industry of the Province. The capital value of the fruit industry is estimated at between fifty-five and fifty-six million dollars, and the annual value of the fruit trade is put at about $8,000,000. This is merely the fruit growing end of it, to say nothing of the many allied industries.

The canning industry affords a good illustration of the development and progress of some of the allied industries. Fifteen years ago there were only six canning factories in Ontario, now there are sixty-six, and the number is increasing every year. These factories employ about seven thousand hands, and pay out for produce about $800,000 a year. The establishment of so many canning factories within the last few years is a most hopeful sign of the progress of the times. They afford a ready means of disposing of a large part of the crop, whereby it can be conveniently distributed to all parts of the country and made use of it all seasons of the year.

Regarding the vegetable growing industry, we can get as yet no very reliable statistics; but I think I am safe in saying that one phase of the industry, that of forcing crops under glass, has doubled many times over during the last five years.

Commercial floriculture is another branch of horticulture that has made wonderful strides within the last few years. It has been estimated that this trade has increased four hundred per cent. during the past ten years, and now amounts to about $2,000,000 per year.

I need not say more along this line. I refer to it merely to show how horticultural work is specializing and developing. Fruit growers are specializing even in the culture of certain classes of fruits. Vegetable gardeners are specializing in field and forcing-house crops. Florists are specializing in the production of cut flowers and decorative plants, while the ever increasing number of enthusiastic amateurs, in both town and country, interested in all branches of horticulture are giving more attention to town and country gardens or civic and rural improvement. And for all both commercial and amateur, in each line of work the outlook never was brighter.

There are no doubt a few dark clouds in the sky. Then San José scale has come in and appears to be going to stay. But this only means that the men who do not spray will have to go out of the business, and the wide-awake, aggressive and progressive growers who wage war on this and all other such pests are going to grow more and better fruit. The failure of the railroads to provide adequate facilities for handling the fruit crop is a matter that was well shown up by a few of our leading fruit growers before the Railway Commission in this city last week. This will be remedied, no doubt, in time, and the sooner the better for all concerned. There will always be battles to fight, but such fighting keeps us keen and on the alert.

If you will permit a personal reference, I may say that when, fifteen years ago, I was appointed Horticulturist at the Ontario Agricultural College, I was the first in the Dominion to outline and teach a regular course in horticulture. And for years, until the School of Horticulture was opened in Nova Scotia, ours was the only institution in Canada giving instruction in horticulture.

At that time fruit growing, because of the commercial importance it had attained, naturally overshadowed the other branches of the subject, and vegetable gardening, floriculture and landscape gardening, were looked upon more as side issues, and were treated on our college curriculum more from the standpoint of the amateur. But such is not the case to-day. These one time minor features in the Horticulture of the Province have made such wonderful advancement during the past few years that none of them care to take second place even to fruit growing.

The development and specialization in Horticulture and the commercial interests concerned are opening up extensive spheres for our young men, and the demand on our educational facilities increases in proportion. The introduction of Agriculture and Horticulture in our high schools; the development of our Fruit Experiment Stations; the extension of our co-operative work in which there are already over six thousand experimenters engaged; the establishment of our new Horticultural Experiment Station in the Niagara District; with the improvement of the facilities in our own College which we are looking for, as well as the kindly co-operation of the Experimental Farm at Ottawa, and the new colleges in the other Provinces, all these should afford to the rising generation inspiration and equipment for the work in which they are to engage. The horticulturist of the next ten years, whether fruit grower, vegetable grower, or florist, is going to have an immense advantage over his predecessors of the past decade.

THE PLACE OF THE FALL APPLE IN FUTURE PLANTING.

By Alex. McNeil, Chief of Fruit Division.

I accepted the invitation to speak on this topic with very great pleasure from the fact that I have a few opinions with reference to the position of the fall apple. These opinions I am anxious either to propagate or else have them corrected before they do mischief. Therefore I submit them to you in the hope that they will be thoroughly criticized, and that we shall arrive at the truth in reference to this matter of apples at different seasons, and perhaps in reference to the different varieties.

It is necessary that we should take this question of the apple industry into serious consideration. There is a little tendency, I believe, always and everywhere, to regard the fruit industry as consisting largely of small fruits and tender fruits. I can readily understand how that idea gains prominence even among fruit growers themselves. I was for many years particularly interested in grapes and peaches, and to me those fruits meant everything; the mere question of an apple more or less, a barrel more or less, an apple crop more or less, did not matter much. But a wider survey of the industry has shown me fairly conclusively that the apple growers of Canada are in the majority in number at least, and I believe they are far in the majority as regards the amount of money invested in the industry. So far as the export business is concerned, the apple is everything, and altogether, I am inclined to think that if we value it at its true worth, whether as a producer

of wealth or reputation for the country, we must regard the apple growing industry as the chief fruit industry of Canada. It is important that we should look at this matter in a large way, and I would ask those who are engaged in other lines—peaches, plums, grapes—to regard with a tolerant eye this matter of apply growing, so that we may as the Fruit Growers' Association of Ontario present a plan of planting, producing and selling the apple crop which will render it of greater national importance than it is at the present time.

With this question is included the consideration of the fall apple, which we emphasize this afternoon because it is perhaps the keynote of the situation. What are we going to do with fall apples? There was a time when these had little value in many parts of the country, and even yet in many places they are regarded as a waste product. On the other hand, we know of a few people, and of a few co-operative associations that are now, and have been, making more money out of their fall apples than out of their winter apples, which are usually considered to be the backbone, if not the whole thing, in the apple business. Neither of these views is right; the fall apple is not altogether worthless; neither is it more valuable than the winter apple, as would appear to be the case from the experience of a few of the more fortunate co-operative associations.

I want to present a clear idea of the place that the fall apple occupies in the apple industry; then we shall have some guide as to where and how it should be planted, and how we should manage the growing of it. I will, therefore, endeavor to give the points in favor of these varieties, as well as the objections that can be urged against them.

I will not particularize varieties as that would lead to an endless discussion; I will not attempt to settle what varieties are fall, early winter, or summer varieties, further than this; let us agree that all apples, no matter what we call them, that have to be marketed before Christmas will class as fall apples, without distinction as to variety. The Wealthy is an early summer apple in Essex county and an early winter apple in Carleton county.

We are all agreed as to the many good qualities of such apples as the Colvert, Gravenstein, St. Lawrence, and, in many seasons in Southern Ontario, the Greening, (practically a fall apple in the Erie counties), and half a dozen other varieties. This includes some of our most prolific apples, and apples of the highest quality. The Gravenstein and Greening cannot be excelled in their particular qualities, either for cooking or eating. The Colvert is a splendid apple, prolific, of good quality, and a good carrier. The St. Lawrence, while not on our list, is an excellent apple, and if properly handled, yields very large returns indeed. We can produce these apples at a much less cost per barrel, than we can produce the Spy. The market for these apples in Great Britain is opening up very rapidly. I am willing to stake my reputation that we can grow these fall apples in competition with the English growers, assuming that they also are growing for the English market. We can produce them more cheaply, and put them on the market more cheaply than they can. We have, then, this unlimited market at our command if we will take certain precautions. In addition, the Northwest market is opening up for these varieties. The greater portion of our Dominion is there; it is developing rapidly, and notwithstanding a few adverse circumstances, the trend of immigration will continue towards this favored land, and we are by no means ready to supply the demand for fall apples that will come from there. Provided the apples are grown right, put up right, and are transported to the West properly, there is an unlimited market.

These apples are desirable because they are prolific; because they can be produced cheaply, and because there is an unlimited market for them. On the other hand, let me say that, so far as the local market is concerned, we shall always have a vast surplus of other fruits, as these apples come in with the later summer and fall fruits. We must always look for competition from other fruits in the local market; and I expect to see the local market flooded once in a while with these other fruits within the next ten or twenty years. They do well now, and will do well on the average, but there will be good and bad years in reference to these crops without a doubt as a result of over planting when the fruit is high priced, and under planting when we have a surplus. So far as the local market is concerned, the fall apple will rise or fall with these other fruits. The earlier varieties of apples will also interfere. There will also be competition with winter apples that are shipped at the wrong season. We shall always have these because growers who have not proper storage houses will not be prevented from marketing their fruit just as soon as there is any encouragement whatever to do so. While the present system of buying and selling is in vogue, it is also possible and probable that itinerant buyers will continue to buy these apples without any thought of holding them. I suppose that four-fifths of the apples bought in Western Ontario are bought to be shipped direct from the orchard either to Great Britain or the Northwest. The buyers have no thought of holding winter varieties until they are fit for market; but they take the varieties I have mentioned, together with Ben Davis and Spy, and harvest them all at the same time. Ben Davis, Spy, and Stark are going forward in large quantities now to the English market. It is in the interest of the apple growing industry of this country to take such means as may be necessary to stop this putting of the Ben Davis apple on the market at the present season. It is all right in February, May, June, July, but to put it on the market now is an outrage. These winter varieties that are going on the market at the present time will always be there to interfere with the sale of the fall apples. The period of cheap apples—when we will have a surplus of poor, second rate or wrongly marketed apples—will be from October 1st to Christmas. It is sometimes the case that apples will sell better then than they will in the winter time. I believe that last year the fall apples sold in the British market for as good a price as they did in January and February, but I do not believe it will be the case this year, nor will it be a normal condition of affairs.

That being the case, how are we going to divide on the planting of apples? Are we going to stop planting fall apples, and trust to the market being filled at that time with the remainder of the early apples, or are we going to provide definitely for the fall apple trade? My advice is to take the latter course and plant the most desirable variety of fall apples, and continue to plant them under favorable conditions and continue to improve our fall apple trade.

Just here let me say that the matter of locality has a great deal to do with it. Where is it desirable to plant them? Where can we grow them best? I would not advise planting these apples in the apple belt extending from Belleville to Lake Huron north of Lake Ontario, and continuing through south of Wellington county to Brantford, going through to Lake Huron and extending along the coast of Lake Huron. This region is specially suited for the winter varieties of the Spy and Baldwin groups. It would be a mistake for any man in this district to plant fall apples as a commercial speculation. In this section plant winter varieties and produce fruit that can be grown to greater perfection here than in any other part, I

believe, of the American continent. This region can produce winter apples from 25c to 50c per barrel cheaper than in any other part of the American continent.

On the other hand, I would not advise people living on the shores of Lake Erie to plant winter apples, but fall and early winter varieties. If I were in that section I would plant very early varieties, and along with these, for larger orchards, fall varieties such as those I have already mentioned.

I say it would be a mistake to plant winter varieties in this southern tier of counties. They are in no better position than are the people of New York State to grow these apples. If these people who are living in the belt I first described have an advantage of 25c to 50c a barrel—remember that is from fifty to one hundred per cent. on the cost of production—it is an enormous advantage, an advantage which if a manufacturer had, he would simply monopolize the whole market, and I believe that part of Ontario can practically monopolize the export apple trade of the continent in fall apples.

I want to say one word of warning, the early apples will not be profitable unless they are grown with far more care than is necessary for winter apples. You cannot grow them with the same indifference to scab and fungus, and to packing and methods of marketing, that you can winter varieties. You must have clean culture, and spraying must be more carefully attended to than with winter varieties. These apples must also be packed in boxes for the best profit, and they must be treated, not as an article of luxury perhaps, but as something of greater delicacy than the ordinary run of market apples. They will not stand shipping in barrels nor will the market stand it. If you are going to make the most of the fall varieties, you must grow them more carefully than winter varieties, and give much more care and attention to the details of packing.

Q.—I come from one of the Lake Erie counties (Norfolk) which you recommend for fall varieties. Suppose I were a young man, and intended planting a commercial orchard, what varieties would you recommend for me to begin with.

Mr. McNeill I would not plant a winter variety, except perhaps the Ben Davis or the Stark, and I would recommend these only because, so far as my experience goes, neither of these apples would be too mature to keep well with ordinary care. You could keep these apples in ordinary storerooms such as any man could provide, and could be reasonably sure of having winter apples for sale in February or March, and no large percentage of loss. On the other hand, if you attempted to keep Spys, they would, in an open winter, show a loss of from 10 to 35 per cent. when you came to repack them. If you plant early apples and fall apples, you would get more for them, if you handle them as I have indicated, than you would for the winter varieties even if you had them to perfection.

Mr. Jas. E. Johnson, Simcoe: As to the planting of fall varieties in Norfolk county, I should certainly object to it. Mr. McNeill has a fruit farm in Essex county, I understand. I consider that the climatic conditions in Essex county and also in the Niagara district are entirely different from Norfolk county. The season of blooming is much later with us. The fall apples such as Duchess and Wealthy ripen at a season of the year when it is still very warm. We have a far warmer climate than in the Georgian Bay district, and the season of picking these early varieties is not nearly as well timed in Norfolk county as it would be farther north. I think that these varieties grow far hardier in the north, and if I had land along the

Georgian Bay and were planting fall apples at all, that is where I would plant them. What are the conditions in the United States? In Michigan, the fall apple section is around Traverse City; in Wisconsin no fall apples are grown with any success south of Reedsburg. In the northern part of Iowa, they raise large quantities of fall apples. We must also bear in mind that enormous quantities of fall apples are being set out in the States I have named, and the fruit produced there will come upon the market at about the same time that our own fruit does. Fall apples from those States are now being shipped to the Winnipeg market in the proportion of four or five cars to our one. Last year the growers in Michigan and Wisconsin got $1.25 a barrel picked, and it cost $1.20 per barrel, duty and freight to place them on the Winnipeg market. As I have said, the acreage being planted to these varieties is very great, and at the season of the year when they come in, it does not take a big percentage to fill the market as there is so much fruit to be had.

In Norfolk county, suppose we had nothing but these fall apples, and there was a large crop in the States named? I do not think we should realize much on our crop. There is also the possibility of warm weather at that season of the year, in which case, if the fruit is delayed for a few days, as it often is, it arrives in poor condition. That is not the case with winter fruit, which will stand far more punishment. Therefore, taking the acreage into consideration, I should feel very much opposed to the growers in Norfolk going into these varieties when they can grow Spy, Baldwin, Greening, and perhaps King—although I do not recommend that on account of its shyness in bearing. They may not keep as long as some others, but I can get 50c. a barrel more for well colored Spy apples in the months of January and February than early varieties will bring. It will pay me to grow them in preference. Those are the varieties I consider we should stick to in Norfolk—that is, those who set out five or six acres. I am putting out a large orchard, and have planted McIntosh, Baldwin and a few Fameuse. I consider there is no apple grown to-day that will make the money for the grower that the Baldwin will. We have in our locality an orchard consisting of four acres of Baldwin, one acre of Spy and one of King. This year the Baldwins yielded about 200 barrels to the acre. The Spy trees yielded 200 barrels this year and about 125 barrels last year; the Kings, 120 barrels last year and 112 this.

Q.—That would give a net profit of about $400 per acre?

A.—About $2,800 on the six acres.

I should like to know how they can grow these apples cheaper in the belt Mr. McNeill mapped out than we can. We have different orchards there of five or six acres that have yielded from $1,200 to $1,500 to the growers. The orchard to which I referred has had the best of care and is a great object lesson. I draw the attention of every member of our Association to it, and I believe it will result in all our orchards receiving far more care than in the past. Up to six years ago, it was very uncommon to hear of spraying, and orchards were neither cultivated, pruned nor fertilized. Last year we had seventeen spraying outfits in our district; this year, there were in the neighborhood of fifty. This is about the way we are developing. Up to three years ago the farmers thought very little of their orchards; after the last work was done they would attend to their orchard; now the first thought is to the orchard; they are beginning to see the money there is in it.

Speaking of Ben Davis, I would not recommend the planting of that apple. It has been planted largely in Missouri, Illinois, Kansas, Arkansas,

Colorado, Montana, and there are a good many in Ontario. It is a good keeper, but very few people hold it in their cellars for their own consumption.

This year is one of the best in fall apples that I ever saw because the crop is short all over. Our sales netted us this year in the neighborhood of $2.85. We should not have realized quite as much if we had not had a retail market to ship them to. Our winter fruit this year realized from $3 to $3.25 a barrel. That shows the increase even though there is a larger supply of winter fruit in proportion to what there was of fall fruit.

As for the Greening, I have a great regard for that apple. I consider it the best cooking apple of the day. Bakeries in the large cities buy them as long as they are to be obtained. I should favor very much the setting out of quite a number of Greenings. They should not be picked too early in the season but left until they are mature. If we set out a lot of Wealthy and Duchess and the markets are flooded, what are we to do with them?

Mr. McNeill: Ship them to the Old Country.

Mr. Johnson: What are we to do with the culls The canning factory is busy with vegetables and other fruits, and cannot handle them. They do not make good stock for evaporating. Therefore we have to ship what are good, and either feed the rest or let them lie. In a few years when the orchards that have been so largely planted come into full bearing, Mr. McNeill will be very sorry that there were so many early varieties.

The Chairman: We should like to know how the two kinds compare in value, both by the acre and the tree.

Mr. W. H. Dempsey, Trenton: During the last twenty years, on the average, I have received more money per acre and per barrel for the fall apples than for the winter—Duchess, Wealthy, Gravenstein, Snow, Trenton, McIntosh—these coming in before December.

The Chairman: With your experience would you plant more fall than winter apples?

Mr. Dempsey: I do not know that I would; I would not plant an orchard of any size with apples for the fall season.

Q.—What fall apples would you plant?

A.—Those I have named, and in certain locations, I would put in Blenheim.

Q.—How would Ribston do?

A.—There are very few cases where I find it doing well.

Mr. Sherrington: I think it would be a serious mistake for those living in the favored districts for winter varieties to plant fall apples. I live in a district favorable for the production of Spy, Greening, and apples of that class, and I for one would not think of planting fall apples, when I could grow better and finer varieties that will pay me better. But there is a place for the fall apple, and there is going to be in the future more than at present, but they require a better system and more careful packing than winter apples, and will likely be handled in boxes. We have, in my experience with our association, a strong market for fall varieties, and it is not necessary now for us to waste any summer or fall apple if it can be quickly transported. With these things, we are receiving just as profitable prices as for winter varieties; but in the southern sections where they cannot grow winter varieties with the same keeping qualities as we can, I would prefer the fall varieties.

J. L. Hilborn, Essex County: I think that in our district there would be money in growing early varieties, principally Duchess, which produces remarkably well and colors earlier perhaps than anywhere else in Ontario. These may be followed with apples of Gravenstein class, which do much

better with us than in colder districts. Greening is practically worthless on the soil along the lake where I live, as it does not thrive. What Mr. McNeill stated regarding the winter varieties is exactly in accord with what I have observed; that Ben Davis and Stark do grow well there and seem to be a better quality—they mature and develop better—than farther north; and they are about the only apple that will keep well till spring. I do not think it would be profitable to undertake to grow standard winter varieties in that locality.

Mr. Macoun: It seems to me that in this discussion the point of view of the Northwest fruit grower has not been taken into account. Any of you who have paid careful attention to the work of Dr. Saunders will know that he now has about 200 varieties of cross-bred apples that are perfectly hardy in the West. I feel perfectly confident that when we get two additional crosses, there will be apples, two or three times the size, that will be hardy all over the country. If so, in 25 years from now, there will be many orchardists growing summer and fall apples in the West to supply the local demand. Dr. Saunders has laid a splendid foundation for Northwest horticulture.

Mr. McNeill: I heartily agree with what Mr. Macoun has said, and am glad to endorse his tribute to Dr. Saunders' work.

Even supposing they do grow these apples in the Northwest, our apples will be marketed and consumed long before theirs are ready. In Essex, Red Astrachans ripen by the 20th July, and would be marketed by the time these western apples are nicely through blossoming, so that no one in the southern counties need be afraid.

I would not advise planting early apples in the north. They have been planted in the north because many of them are exceedingly hardy and are the only apples that will grow. They have been planted not because they are early but because they are hardy; they do not compete with us because there they become fall apples. The fact that they have been planted in the north makes it possible to ship Duchess apples to Great Britain from August 1st to September 1st and always in their prime. To have that length of season is a great market advantage.

I heartily agree with everything Mr. Johnson said in reference to the apples of the southern counties. I do not want to be misunderstood on one point: If you have winter varieties do not cut them down. It is a distressing condition that people should be so unintelligent as to destroy property worth from two to three hundred dollars per acre simply because they are not willing to learn how to handle the product, as they have done in Norfolk county and elsewhere. Mr. Johnson has done a remarkable work in the interest of fruit growing. By organization, apples that were formerly worth only 50c. a barrel are now bringing from $1.50 to $2, and for this you have to thank Mr. Johnson, who has created wealth as truly as if he had taken it out of the soil; more truly, indeed, for he has taken these thousands of dollars out of the earth and the earth is no poorer for what he has done. (Applause.)

Mr. Peart, Burlington: Mr. McNeill's address was based of course on general principles. I do not doubt for a moment his statement that early apples should be grown in the southern parts of the Province, but I would not think of limiting southern growers to those varieties. Where I live we plant not only summer and fall apples but winter apples. We plant Duchess, Ribston Pippin, and King; also the winter apples, Spy, Baldwin and Greening. When I am asked a question as to what varieties to put in an orchard, I usually answer it like this: There are no two localities that will grow the same sorts of apples with equal profit. There is

great variation in farms and a greater variation in localities. If I were asked that question by a young man in my district, I should probably point to several of the leading varieties in that district, which I know from my experience have made money for their owners. So in other localities. My advice would be: go to a successful apple grower of experience in your locality and ask him what varieties he would plant; follow his advice and you will not go far astray.

Mr. JOHNSTON: I look for Baldwin and Spy apples to sell for more money in the future even than they are selling for at the present time. Very few have been planted in Southern Ontario or in Western New York.

Mr. HAROLD JONES: Speaking as a practical fruit grower, I think we should be a little cautious about too many early varieties. We must remember we are handling a perishable product. If we overproduce the more perishable part of an already perishable product we shall suffer in the end. Early varieties come into bearing at an earlier age than the winter varieties; therefore you are liable to have over-production of this class of fruit quicker than in winter apples. Early varieties have been planted quite largely in the last few years. In the St. Lawrence Valley there are no winter varieties being planted.

Mr. MCNEILL: I would not plant them there; but there are no winter varieties being planted in Southern Ontario.

Mr. JONES: We do not want it to go forth that this Association recommends the wholesale planting of early varieties through the Province.

Mr. MCNEILL: Certainly not. Commercial orchards of early apples should be planted in Southern Ontario only.

ERRORS IN SPRAYING.

PROF. H. A. SURFACE, HARRISBURG, PA.

I have not prepared a paper for this occasion, and shall have to speak extemporaneously upon the subject:

A number of erroneous impressions are common in regard to spraying. There is a general impression that spraying is a preventive of all loss in fruit growing. Nothing can be more fallacious; it is not. I will try to bring out more clearly what I mean. First, there is a general feeling that it is necessary to spray to prevent the appearance of insects. I know of only one insect for which we spray to prevent its coming; that is the codling moth. We do not spray to prevent the coming of insects, although we do spray when they are present to destroy them and prevent loss by their attacks. If I had an orchard free from insects, I should not spray with anything, so far as insects are concerned, excepting that I would spray at the proper time and with the proper material for the codling moth.

There is a very general impression that Bordeaux mixture is an insecticide; it is not. At the same time, it may act as a repellant and drive away certain insects. It is simply a fungicide composed of copper sulphate and lime and if we wish to make an insecticide of it, you must add an arsenical poison.

There is also an impression that Bordeaux mixture will cure plant diseases. There is a difference between curing and preventing. Prevention is better than remedy. It will not cure fungous diseases, but will help to prevent their appearance. There is a great difference between spraying with insecticides and with fungicides. The difference is this: With insecti-

cides, in all cases save that of the codling moth, we spray as a remedy; with fungicides, we spray to prevent the appearance of disease, such as scab, leaf spot, rot, mildew, peach leaf curl, etc. After such a disease as leaf spot or fungus has started in a leaf it cannot be cured in that leaf.

Again, there is an impression in our State that benefits can come from spraying trees in bloom. We do not spray blossoms and no benefit of any kind is to be had from doing so. It is bad horticultural practice. If there be a surplus of blossoms and you wish to reduce them, it will help to thin the crop, but it is a poor way of thinning, and not to be recommended. I have seen abortive fruit produced in this way and, besides, there is the danger of killing bees, which do so much to fertilize and cross-fertilize the blossoms.

There used to be an idea that spraying would poison fruit or vegetables. This especially was thought to be the case in spraying cabbage for the cabbage worm. Our best gardeners spray cabbage with Paris Green, and analyses show that a person would have to eat about two hundred cabbage heads to get enough Paris Green to affect him. Spraying does not poison fruit and there is no danger of its doing so.

Another mistake is the thought that animals are liable to be poisoned by eating grass under trees sprayed with Paris Green or arsenate of lead. There is almost no danger in this respect. Of course there should be no grass in the orchard, unless the "sod-mulch" system is being practiced—a method that is well worth trying.

There is an idea that spraying kills bees. With lime-sulphur wash that is absolutely wrong as the wash is applied before the buds burst. With other insecticides there is no danger so long as they are not applied while the blossoms are open.

Many people think that if a little is good, more is better. That is a very poor belief. There is more danger from too much than there is from too little. Too much may endanger or kill the plant. Too diluted a formula may result in not accomplishing the work for which you are spraying—in not preventing the disease or killing the insect—but you will have no other loss than that of time and material and possibly continued pests; whereas, if you use too much, you are liable to injure the fruit or even kill the trees. There are certain materials of which it makes little difference if you use too much, such as the lime-sulphur mixture and the Bordeaux mixture applied when not in leaf.

The question was raised last night as to whether aphids could be killed by the lime-sulphur wash. I know it can be done as I have seen the boiled lime-sulphur wash clean up both the apple aphis and the cherry aphis, applied just before and when the buds where bursting.

It is the general opinion of operators that materials can be mixed by guess. They should be weighed and measured most carefully, to the very ounce. When I tell a man to spray 8 per cent. kerosene, I do not mean 10 per cent., and if he should use 4 per cent. or 5 per cent. above what I say he is to use, it is liable to result in injury to his trees, under certain conditions. A man should know the exact percentage to use, as well as the correct time to apply it.

There is a general impression that spraying can be done when the wind is blowing, with satisfactory results. It is almost impossible to spray against a wind. You should spray with the wind and cover that side of the tree; then you must wait till the wind has ceased or changed direction before spraying the other side. That is the only proper way to spray if windy. You cannot throw a spray against the wind, although you might use a

squirt-gun or a fire hose and throw a stream or jet, but that is not spraying. The spraying material, in a fine state of division, should drift over the tree in the form of a mist, and not be thown as a stream, and sometimes not under too great pressure. I have known of cases where so much pressure was used with Bordeaux mixture that the material was actually driven into the pores of the leaves, which were severely injured in consequence. There is a possibility of injury by using too much power when the leaves are in a delicate or tender condition.

Q.—Would 35 pounds pressure be about right?

A.—Yes, and then you will not have this difficulty. Many people using power outfits spray at from 60 to 80 or more pounds pressure, and rarely get below 40 pounds. High pressure will not cause any injury when trees are dormant.

Many suppose that the height to which the spray is thown depends upon the power of the apparatus. That is not so. What is required more than anything else for very high trees is sufficient length of hose and an extension rod, with ladders for operators to climb.

Efficient spraying cannot be done with poor, cheap hand apparatus, For the average orchard I would not recommend anything cheaper than a good barrel sprayer.

Many men seem to think that one spraying should be enough. Some write me: "I sprayed my trees once, and the scale is there still; I am disgusted with the formula you recommend." It takes more than one dose of medicine to cure a disease, and more than one spraying to overcome scale.

If we can control the San José scale, and produce first fruits without much expense that ought to be sufficient to satisfy us for the present; we can never ged rid of it entirely. Do not think you can spray two or three infested trees in an orchard and leave the rest. Under such conditions all the trees should be sprayed, being sure of the second or re-touching spraying.

Some think they can modify the formula recommended and get better results. It is not safe to attempt it.

The following facts are not generally known:—

That sprayed fruit keeps longer than unsprayed, without damage.

That sprayed fruit stays on the trees much longer than when unsprayed.

That some diseases are not to be prevented by spraying, namely, apple and pear blight and peach yellows.

The operation should be for a definite object; we should know for what we are spraying, and then spray thoroughly at the right time with the right material, in the right proportions, with the proper apparatus. This is a very important thing. Spraying is not in itself sufficient to produce good fruit; we must have cultivation, pruning, and thinning of fruit, and finally we must spray as the most satisfactory means of controlling insect pests and preventing plant diseases.

Q.—Do we understand you to say that spraying will not prevent leaf curl?

A.—It will prevent it, but not cure it after it has started; after the leaf has started to curl, it will not cure it. There is a difference between prevention and cure.

Q.—How soon after the leaves are off is it safe to spray?

A.—At least ten days should elapse after the leaves are off. The base of the petiole of the leaf leaves a deep surface scar, and until that heals over it is not advisable to spray. (This refers to fall spraying for scale insects). In spraying for codling moth, in spring, the important point is to spray just after the petals fall, and then again in ten days' time. Some of our growers are getting 98 per cent. perfect fruit. You may use Paris Green

and Bordeaux mixture together, although I believe arsenate of lead is more effective and nearly as cheap as Paris Green; but a good unadulterated Paris green is excellent.

Q.—What do you use for oyster shell bark louse?

A.—I have seen bad infestations entirely cleaned out by one double spraying of lime-sulphur wash in the fall of the year. This mixture will kill all the scales, and also the cigar case-bearer, eggs of the tent caterpillar, aphids, and many other insects.

Q.—What do you mean by double spraying?

A.—Two coats; after the first coat is dry, give the trees a retouching spray. This is especially necessary in spraying for San José scale. We have growers who are spraying every year because the lime-sulphur wash has such a tonic effect on the trees, although it may not be absolutely necessary in order to keep the scale in check.

Q.—Do you recommend scraping?

A.—I do not think it is necessary so far as scale is concerned.

Q.—Does it injure the tree?

A.—It can, if too deep. You should not scrape so deeply as to injure the bark.

Q.—Is salt of any value in the lime-sulphur mixture?

A.—It is not necessary, and we do not recommend it. When salt is added to this mixture there is sometimes injury to peach twigs and buds by spraying just after the leaves fall.

We are in the midst of experiments with sulphur-soda wash as a treatment for San José scale. Our first experiments killed the fruit buds, and we have not experimented far enough for me to say just what strength should be used with safety. My opinion is that it should be about as follows: 4 lbs. caustic soda or concentrated lye, or even washing soda, boiled with three times as much sulphur for an hour, and diluted with 40 or 50 gallons of water.

THE STAIRWAY TO SUCCESS.

By Anson Groh, Preston.

A stairway of course is only a substitute for a ladder, either one of which is very convenient when you want to rise. Our forefathers were quite content to use a ladder, whereas we think we need a stairway. I think though, that they were more steady of nerve, than we of the present day. When any of those sturdy ancestors got hold of a rung of a ladder to sucess, or fame, or honor, they took a firm hold, placed their feet firmly on the lower rungs, then moved deliberately from rung to rung upwards. No matter how high they got above their fellows, they seldom lost their heads and tumbled down; but in these fast days, when everything is done with a rush, the ladder is not a safe way of going up. We see men go up with a rush but missing their hold, or getting giddy and losing their heads, they come down with a crash that is anything but pleasant. I have witnessed so many disastrous falls, that I have been moved by compassion to devise a stairway that shall be more sure and safe. To be sure many would rather go up on an elevator, but really I cannot accommodate you. The stairway which I have named. "The Stairway to Success," is not patented, it will not even be obtainable ready made. Every one must build his own, an the proper time, in fact the only practical way to start is when young.

Now before we give definite plans about laying the foundation, let us consider what is to be at its top. We call it "Success," but what is success? Some call it wealth, some again think it is honor, or fame, and yet others think they have made a great success of life if they can but gain notoriety. Yet I and many others will claim our mode of success, is every time we bring to a consummation our most ordinary undertakings. Now please do not despise this inconspicuous sort of success; for many of us will never have any other, and those who cannot habitually attain to this ordinary success, will very likely be classed as failures, for whom would entrust any very important undertakings to the man who has had many plans and schemes underway, but has brought few to a finish. But how shall a man be always justified in the execution of his resolutions when he has formed his resolve in error? Or how shall our resolves be always correct, when based on wrong conclusions which in their turn are the fruits of immediate consideration? And now observe we have gotten to the foot of our Stairway, which we have called consideration. Here we should spend much careful time and labor. You will never regret the time you spent faithfully here. These are your school days, the days you spend laying the foundation from which any stairway in the future must rise. It is a sort of block pavement, which if well laid, will be a beauty spot to retire to, upon every convenient occasion. The blocks from which this foundation is made, are the beautiful truths which will be so intimately related to your life's future calling. The size of this foundation will depend upon the number of these beautiful blocks of truth you may be able to gather into place, and its beauty and efficiency upon the correlation and harmony with which you place them.

Allow me here to state for those who think the farmer needs no special education, that the most extensive and beautiful foundation or "beauty spot" that can be laid is that made of the blocks of truth related to his broad calling. But whatever your calling in life may be, get thoroughly acquainted with its foundation principles and truths. If with these you have learned to properly think and reason what comes to your consideration you will be ready to put on the next rise, which we call conclusion. If your conclusions are well placed and firm, it will be safe to build thereon a safe "resolution." But, however, good your resolution may be, it will avail you little, if you do not bring it under "execution." Therefore place over it the riser execution, upon which when it is finished, but not before, you may place consummation, above which you will always find the banner of success. I realize that for many this structure does not appear elaborate enough, it does not aim to go high enough. But what would be your estimate of the man who, after examining the individuality of a tiny rain drop, despised it, and refused to have a cistern attached to his house, because he had no assurance that rain drops the size of hogsheads would fall upon its roof and gently flow down and fill the cistern? Nay, but remember the mighty heaving ocean is kept filled by the inflow of great streams of water, formed by the accumulation of countless numbers of these tiny individual rain drops. And then, if you ever rise to the fulness of a noble honored and useful life, it will be not by a few masterful strokes of great genius, but by the ordinary daily accumulation of duties well done.

The great majority of young men stand out in life, full of hope and confidence that they will make a success of the problems of life; yet we soon find numbers of them stranded along the way. It is not pleasant to be counted a failure. It may be profitable to examine into some of the causes of so much slow progress. Too many have not the patience to spend enough time at the foot of the stairway, in consideration, meditation, deliberation. It is so much easier and quicker to gain the next step by jumping at con-

clusions, but whoever reaches his destination by this quick move, can never be safe except in following behind in a beaten track. Only the thinker or deliberator can succeed. Again there are those who acquit themselves well on the first two steps of the stairway they know it all, they reason well, they step up to proper conclusions, to correct determinations of fact; but they apparently lack the courage to step up to resolution to a determination of action, lacking fixedness of purpose. Such seldom can undertake to accomplish anything without some one else standing responsible, for they are much in want of self reliance.

Perhaps, however, of all the wreckage found along the way, most of it is found as we move up to "execution." Much has been brought there to do, but is never done. How very many of us know much better than we do. We even many times resolve to do, but never execute our resolve. From the step of execution down may be a well known track, as we have brought up one resolve after another and left them lie. This is all utter loss of time and effort; for only as each task is finished and disposed of according to our resolve, we are entitled to step up to the head of the stairs called consummation, and there claim our crown of success.

FARM MANAGEMENT.

By R. H. Williams, Orangeville.

The subject I have chosen to speak upon is "Farm Management." This is a very general subject, but I feel it is a most important one to the average farmer. Since every farmer is a farm manager, it will be seen that you are all interested in this subject.

At the outset I may say that I have had the training which an Ontario two hundred acre farm affords, and during the last four years I have had the experience of being farm foreman of a thousand acre farm, and manager of a smaller one in New England. I have given this branch of Agriculture close thought, besides visiting scores of the best farms in Ontario, New England and the Middle States. The more I look into the matter, the more certain I feel that the management of the farm is one of the most neglected subjects connected with agriculture. Even the Agricultural Colleges are commencing to see the importance of this subject, and now offer special courses to supply this long felt want, but we have much improvements to make yet. Perhaps there are reasons for the present condition of affairs: I know not; but I shall suggest, in a general way, a few improvements along this line.

While passing along country roads I have frequently heard the remark "that is a good farmer." The speaker may continue and say: "Why look; everything seems to be in perfect condition! The weeds along the road and lanes have been cut; his fields are filled with good crops; the fences and gates are all in good condition; his buildings are all painted and repaired, and his yards are clean and dry. Everything is in order." Perhaps the next farm offers a sad contrast. Everything may be seen to be out of place; weeds are found growing rank and strong unmolested along the roadside, in the lanes, and in the growing crops; the fields are surrounded by angling, falling down fences; the gates are propped shut or have fallen down, hay, grain and roots are growing in patches here and there without any regularity; his barns and house may be large, but they are showing neglect and carelessness, while the barn-yard is wet, the manure piled up in heaps and

implements are strewn around the barn and house. Everything shows the absence of a master farmer, and depreciates the value of the farm, besides resulting in many inconveniences.

I don't suppose any of the farmers here have such a farm as the latter describes, for I know that it is usually the best farmers who attend the Institute meetings, but you will agree with me when I say that the difference between the general appearance of the two farms was due to the difference between the farmers. One man puts business principles, care and attention into his work, while the other did not and hence the result.

In a general way we may say that there must be certain elements of success in the farm manager before he can be a successful farmer. He must first have a love for his land, and animals, and feel that he is following one of the highest nd most honorable of all trades or professions. After the proper relations are established between the land and the manager, the other requisites are usually present. The pride for his farm, and the desire to get along well, will help the farmer over many a temptation to neglect certain items, and make of him a business man, who can do work himself, as well as see that others do the work at the proper time, and in the proper manner. A short time ago I was told by a farmer that there was more business ability called for in his every-day life than the average business man needed to use. I believe that this is true, and all successful farmers will agree with me too. You farmers have to use business principles every day in the year; if you are not selling a bunch of "Prime Export Steers," or lambs, or horses, or "Singer Bacon Hogs," you are feeding those to make a profit, and your markets fluctuate so much that some of your problems would perplex and worry a stock exchange manipulator. Thus we see that the successful farmer must be an all round man, who is willing to pay close attention to the details of his work.

Many farmers lack system in their operations. This is due to the great pressure of work, to lack of planning, or to the manager himself, but nine time out of ten it is due to the lack of planning ahead. Have a system and follow it—plan ahead—make use of "slack times" to keep up with your work. We know that the excuse sometimes made, "the work is so pressing I can't find time to do everything in exactly the right time, and something must be left undone," is a lame one. I think that with our modern machinery rotation of crops and making the most of our so called "slack times," we can equalize the work to a great extent, and not have any especially busy times. If the land is plowed in the fall, the manure hauled out in the winter, and our seed and implements all prepared before seeding, with our teams conditioned to stand hard work, why should the seeding be so much dreaded? After putting in the spring grains, the root crops and corn, there is usually a slack time till haying. This gives the farmer a chance to repair his fences and buildings, do his road-work, cultivate and hoe crops, eradicate weeds, overhaul the haying implements and in a general way improve and make the place more attractive. There may be some underdraining that might be done at this time, but when the time for cutting the hay comes, the farmer should have little to do except to attend to his hay crop.

Of course the roots will require cultivation, but there are always spells after rain when we cannot work at the hay, and the teams should be employed regularly in the root and corn fields. I think that much depends upon the work done before haying; if the work has been carefully done before the first of July, the farmer is in a good shape for keeping ahead of it the rest of the year; but if haying is commenced before the fences are repaired and the roots well cultivated, I am sure that the farmer will be behind the rest of the year. (I know what I am talking about because I have been behind and

before at the commencement of haying myself, and some of you here have been in both places yourselves and you know too.) So it is with the farm operations of the whole year; if we plan ahead and make the most of our time, so that we work to the best advantage, we can usually keep right up to the work, and then farming is not drudgery but a pleasant occupation. The work will not be neglected, but everything will be thoroughly done at the right time, and in the correct way. Under this heading I would say: plan ahead, be thorough, make the most of slack times, follow a regular system and keep up with your work.

Have large fields—use wire fences—keep the rail fences you have in good order. I noticed a statement in the recent annual report of the Bureau of Industries for Ontario, to the effect that farmers are building more wire fences and making their fields larger. This is a sign of progress, and many farmers are making improvements along this line. The old rail fences have become broken down until they do not turn stock, and, in many places, it has been found that these rails can be hauled to town to be used as fuel; and the enhanced price of wood in some cases pays for the cost of new wire fences. The old crooked rail fence is a regular harbor for weeds and injurious insects, unless care is taken to keep them clean. Many farms are divided into too many fields. It is now thought wiser to have the fields larger, so that there will be less turning with teams and machinery, and the work can be done with greater facility. The size of the fields should vary with the size of the farm, or the rotation followed, but there should be no more fields unless on a very large farm than there are years in the rotation, unless for permanent pastures, or other special requirements.

Fight weeds—use care and judgment. No good farmer will allow weeds to grow unmolested in his land. Weeds are in nearly every way objectionable. They not only rob the crops of moisture and plant food, thus reducing the yield, but they depreciate the value of the farm and crops growing thereon, besides making the work more difficult. I requires careful management to clean a weedy farm, but when we do get our land free of weeds we must use care and judgment so that it will remain clean. I would recommend the following points to serve as a safeguard from weeds:—

(1) Be careful not to take in weed seeds in your grass seed, grain, implements, threshing machines, bulky fodder or manure.

(2) Follow a rotation of crops.

(3) Make frequent use of hoed crops, such as corn and roots in your rotation.

(4) Thorough cultivation, before seeding is the best time to destroy weeds, and care should be taken to give them such a hard brush, before the crop sowed gets a good start, and takes possession of the land. It is also wise to plant upon such land, crops that are best able to hold their own against the weeds.

(5) Keep a close watch upon waste places, lanes, fence corners and pasture fields.

(6) Aplly unrotted manure to the root crops, for the weed seeds will be germinated and killed by cultivation.

(7) Do not allow weeds to go to seed.

(8) Keep sheep because these animals are great enemies to weeds.

Take Care of your Implements, Over-haul in the Fall.

Another suggestion in regard to farm management is in connection with the tools and implements. Have a place for each implement, and try to keep them in their places. I think that if there is anything which indi-

cates poor management more than another, it is to see farm machinery left out in the sun, rain and snow. Nearly every good farmer has a place to store his implements, where they are kept, except when in use. It not only looks improper to see tools lying promiscuously around the yard, but those implements will not be in shape to work well and they do not last more than half the time that they would if well cared for. Moreover, before you store them for the winter it is wise to overhaul and set apart all pieces that require repair, and get them repaired right away so that they will be ready for work at any time. Often when broken implements are stored for the winter they are never touched (because they are at the back of the implement house, or for other reasons) until they are required for work in the spring, and then the farmers and blacksmiths are busy, and there is some delay.

The "Hired Help Problem."

It seems necessary to say something about a very difficult matter to solve, and that is the "Hired Help Problem." Wages are so high that few farmers feel that they can afford to employ the required help, and many farmers cannot obtain help even for the high rate. It is a stern reality that we must meet and do the best we can under the circumstances. Farmers are nobly re-adjusting themselves to the changed conditions. They are using larger machinery, and heavier teams, so that one man and three or four horses can do as much work as two men did formerly; and it is no harder on either the man or the horses.

The use of wind-mills, two furrowed plows, wide harrows, cultivators, drills, mowers, and binders, the side delivery hay rakes, hay loaders, and forks and slings for unloading in the barns, have helped to reduce the necessary labour, but even yet satisfactory help is scarce. The farmer, knowing that it is the effectiveness of the work rather than the total amount done that counts, is commencing to plan his work ahead so as to do it to the best advantage, and by making the most of what help he has is often able to accomplish as much with one man as he could formerly with two. The use of straw blowers attached to the threshing machine is overcoming some of the difficulties of supplying hands for threshing, but even yet we could improve upon this, and do it in the winter, or else have a full gang go with the threshing machine. Time and necessity, we hope, will help us formulate plans and methods for overcoming the "Hired Help Problem."

I would like to sound a cheerful note and encourage you farm managers in your calling. We have passed the time when the farmer thought there were superior professions to his own. Now even the most wealthy men deem it an honour to be a farmer. Thoughtful people are commencing to realise that Agriculture is the foundation of all nations, and slowly the tide is turning in our favor, as it must, and before long we hope to see Agriculture occupying her merited place at the top, recruiting from all ranks the bravest, noblest, and most intelligent to follow this highest of all professions, farming.

In conclusion I would repeat the suggestions:—Be business like in all your doings, plan ahead so that the work of the whole year will be equalized, make the most of slack times; be thorough in everything; do not put off necessary work; be progressive, take an Agricultural Paper and read it and all Government reports, and love your occupation which is the healthiest, most independent, honorably important and congenial of all in the whole world.

IMPROVED FARMS FOR SALE. A NEW DEVELOPMENT FOR IMMIGRATION.

Thos. Southworth, Director of Colonization.

For some years past the Bureau of Colonization has received inquiries from people in the British Isles and the United States for improved farms in the settled part of Ontario, as well as for the unimproved or "wild" lands of the Crown. Inquiries of this sort also reach the Bureau from immigrants who have been working on farms here as laborers, but who brought with them, or have earned more cash capital than would be necessary to enable them to establish themselves on Crown Lands, and of late inquiries of the kind above referred to have become more numerous.

These men realize that to undertake the work of creating a new home in the bush or on the prairie entails a degree of hardship to which they hesitate to introduce their families, and requires a certain knowledge and adaptability to pioneer conditions which they do not possess, hence they usually prefer, when they have sufficient capital and desire to follow an agricultural life, to do so amid conditions approaching those to which they have been accustomed.

Southern or "Old Ontario" as it is sometimes called to distinguish it from the northern part of the Province, offers just the conditions required.

There are certain improved farms in Ontario that for various reasons may be purchased from their present owners for considerably less than their producing value. The movement of farmers' sons and farm laborers to Northern Ontario and to the Northwest Province on account of the cheap Crown Lands there, has left some farmers in Old Ontario dependent on inexperienced help, and these men, having acquired a competency, wish to retire from active work and settle down in the nearest town, or join their sons who have acquired land elsewhere.

It frequently happens also that the boys raised on the farm have developed a taste for the professions or for mercantile life, and drift to the cities with the same result for the parents left with the old homestead, and no children to work it.

There may be other reasons such as sickness, death, etc., that tend to throw some excellent properties on the market.

Heretofore, when inquiries for improved farms were received, they were referred for information to reliable agents handling this kind of property, but this plan, in view of the increasing number of inquiries, was felt by the Minister of Agriculture to be inadequate and the Bureau of Colonization has, therefore, undertaken to receive and register information as to farms for sale for the benefit of the men who wish to buy and the men who wish to sell. While this work is undertaken mainly with a view of acquainting newcomers and prospective immigrants with the advantages of farming in Ontario and affording them a ready means of ascertaining where such properties as they desire may be obtained, it cannot fail to be of equal service to the men who have such properties to sell.

In order that this list of improved farms may be as complete as possible, the Bureau invites correspondence from anyone having farm property for sale.

A postal card addressed to the Director of Colonization, Parliament Buildings, Toronto, by the owner or agent having farm property for sale will secure a printed form to be filled in with particulars as to acreage, buildings, etc., which when mailed to the Bureau will be placed on the list of farms for sale.

Printed copies of this list of farms for sale will from time to time be sent abroad for distribution by the Provincial Immigration Agents, and the list may be consulted by buyers at the office of the Bureau of Colonization in the Parliament Buildings.

It might be added that in the list as printed for distribution, the exact location of the farm or the owner's name will not appear.

It is not proposed that the Bureau of Colonization should act as real estate brokers or assume any responsibility for the sale of the property. In case an intending purchaser finds among the list a property, the location, area and price of which meets his approval, he will be placed in direct communication with the owner or agent as the case may be.

There will be no charge or commission of any sort in connection with this service.

CATTLE FEEDING.

R. Harcourt, Professor of Chemistry, Ontario Agricultural College, Guelph, Ontario.

The study of the science of cattle feeding has received a great deal of attention during late years. Fortunately, while a knowledge of the results of the numerous investigations would be a great aid to the thorough understanding of the subject, it is not essential to success; for the practice of some experienced feeders leaves little to be desired. They probably have learned much from their forefathers, and, with this to commence with, and long experience with the same kind of cattle and feeding stuffs, have become somewhat proficient in the art of feeding.

There are, however, many farmers, both old and young, who have had comparatively little practical experience handed on to them and who may have to deal with feeds that are new who will be interested in looking into some of the underlying principles in connection with this subject.

To obtain a full understanding of the subject we must learn something about the various substances which make up the animal body; the part the different constituents of foods play in building up the tissues of the body, enabling the animal to do work, etc.; the differences in composition and digestibility of different food stuffs; and the proper combinations of these to give the most economical results.

The Constituents of the Animal Body.

The animal body is made up of four classes of substances—water, ash or mineral matter, nitrogenous matter, and fat. The first contituent we are quite familiar with, but we often fail to realize that it forms the largest ingredient of young and lean animals. In very fat animals, as in an extra fat sheep, the fat may be the most abundant material, but in all other cases the water is present in the largest proportions, amounting to as much as 85 per cent. of the weight of the young calf and falling as low as or even less than 50 per cent. of fat animals. The nitrogenous matter, best illustrated by the lean meat of the animal body, is naturally most abundant in the lean animal, but the proportionate amount decreases with fattening. The percentage of ash material, principally held in the bone, becomes less with maturity and particularly during fattening.

The percentage amounts of these different constituents present in a large number of animals has been determined at Rothamstead, England. The following table shows the average percentage composition of eight animals, after deducting the contents of the stomach and intestines:

PERCENTAGE COMPOSITION OF WHOLE BODIES OF ANIMALS.

	Per cent. in butcher's carcass.					In live weight of animal.				
	Ash.	Nitrogenous.	Fat.	Dry matter.	Water.	Ash.	Nitrogenous.	Fat.	Water.	Dry matter.
Fat calf	4.48	16.6	16.6	33.7	62.3	3.80	15.2	14.8	63.0	33.8
Half-fat ox	5.56	17.8	22.6	46.0	54.0	4.66	16.6	19.1	51.5	40.3
Fat ox	4.56	15.0	34.8	54.4	45.6	3.92	14.5	30.1	45.5	48.5
Fat lamb	3.63	10.9	36.9	51.4	48.6	2.94	12.3	28.5	47.8	43.7
Store sheep	4.36	14.5	23.8	42.7	57.3	3.16	14.8	18.7	57.3	36.7
Half-fat old sheep	4.13	14.9	31.3	50.3	49.7	3.17	14.0	23.5	50.2	40.7
Fat sheep	3.45	11 5	45.4	60.3	39.7	2.81	12.2	35.6	43.4	50.6
Extra fat sheep	2.77	9.1	55.1	67.0	33.0	2.90	10.9	45.8	35.2	59.6
Store pig	2.57	14.0	28.1	44.7	55.3	2.67	13.7	23.3	55.1	39.7
Fat pig	1.40	10.5	49.5	61.4	38.6	1.65	10.9	42.2	41.3	54.7

The above figures show that the largest proportion of nitrogenous matter and of ash are found in the ox, the smallest in the hog. Consequently there is less of the fertilizing constituents of the farm sold in hogs than in oxen.

The composition of the increase as an animal gains in weight varies much under different circumstances. The increase of a young growing animal will contain much water, nitrogenous matter, or lean meat, and ash; while the increase of an adult animal during the fattening period will consist chiefly of fat. It follows that a smaller amount of food is needed to produce a pound of increase with an adult fattening animal. The percentage composition of the increase of oxen, sheep and hogs, when passing from the thin or "store" to the fat condition has been calculated by Lawes and Gilbert of Rothamsted with the following results:

	Water.	Nitrogenous matter.	Fat.	Ash.
Sheep	22.0	7.2	68.8	2.0
Oxen	24.6	7.7	66.2	1.5
Pigs	28.6	7.8	63.1	0.5
Mean	25.1	7.6	66.0	1.3

The increase during the fattening stage of growth contains, according to these figures, eight or nine parts of fat to one of nitrogenous matter. The same authorities state that the proportion of fat would be somewhat greater still in the increase of highly fattened animals. These figures show very clearly the reason why a farmer should strive to sell all animals in the fat or finished condition.

FUNCTION OF THE DIFFERENT CONSTITUENTS OF FOODS.

When we study the food of plants we find that from such simple substances as carbon dioxide, nitric acid, water, and a few salts, a plant is capable to constructing a great variety of elaborate compounds. It accom-

plishes these surprising transformations by a consumption of energy (sunlight) external to itself. An animal has no such constructive power. The animal frame is built up of substances existing readily formed in the food, or produced by splitting up or partial combustion of some of the food constituents in the body. The animal derives no aid from external energy. The temperature of the animal body (about 100° F.) is maintained by heat generated within the body by the combustion of the materials eaten as food. The energy required for masticating food, pumping blood through the system, walking, drawing loads, etc., is also derived from the food eaten. The source of heat and force in the animal is thus purely internal.

It is evident from what has been said that the food of animals has duties to perform which are not demanded of the food of plants. In plants the food merely provides the materials for building up the vegetable tissues. In the animal, besides building up the body tissues, the food has to furnish the means of producing heat and doing mechanical work. In order that this may be accomplished, the food must be burned in the body, just as coal or wood is burnt, that we may get energy from the engine.

The principal food constituents of all vegetable food may be divided into four groups: (1) *protein*, which includes both the albuminoids (proteids) and amides; (2) *fat;* (3) *carbohydrates*; and (4) *ash* materials.

The albuminoids which occur in grain, roots and other forms of vegetable food, are similar in composition to those found in milk, blood, and flesh. These substances are commonly called "flesh formers" as they are the only materials in the food from which the animal can construct flesh. They are also the source of such materials as hair, wool, horn, etc. Further, by the combustion of these albuminoids in the body, heat and mechanical force are developed, and, under some circumstances they are split up with the formation of fat. It will thus be seen that the albuminoids supply all the requirements of the animal—a statement which can be made of no other food constituent.

The amides are immature forms of the albuminoids and have no power to form flesh, and when burnt in the body produce only about one-half the heat of the albuminoids. They are, consequently, of distinctly less value than the albuminoids. Their chief value seems to be that they in some way, not clearly understood, help to protect the expensive albuminoids of the food from being wasted.

The fats found in food are similar in composition to such substances as lard, tallow, etc., which are the common fats formed in the animal body. The fat may be either burnt in the animal system to furnish heat and energy or deposited on the body as fat. As a heat and force producer, fat has a greater value than any other ingredient of the food.

The carbohydrates of the food are chiefly starch, sugars, and celluloses, and form the largest part of vegetable foods. The latter substances form the stiff framework of the stems of plants and the hulls of seeds and are only partially digested. These carbohydrate bodies are not permanently stored in the animal body, but serve, when burnt in the system, for the production of heat and mechanical work. They are also capable, when consumed in excess of immediate requirements, of conversion into fat.

The ash materials present in the food are the same as those found in the animal body; all that is accomplished by the animal is to select from the digested ash constituents those of which it is in want.

From what has been said it will be seen that the albuminoids are the only constituents of the food which are capable of being transformed into flesh. They will also produce heat and mechanical work, but fat and carbohydrates, especially the latter, are the cheapest materials for this purpose.

To make the most economical use of foods, the albuminoids should be fed in such quantities that they will do the work which they alone can do, and allow the heat of the body and the energy for work to be obtained from the cheaper fat and carbohydrates. These are the facts which form the basis of the balanced rations and feeding standards; for a balanced ration is simply a statement of the weight of protein needed by the animal of a certain weight to do the work required of it in growing, fattening, or in the production of milk, etc., together with the weight of fat and carbohydrates required to keep up the temperature of the body and do what mechanical work is necessary and leave a residue for the formation of fat, if such is desired. Naturally a young growing animal will require more protein in its food than one full grown; for it is building up bone and muscles,—both of which require protein. Thus milk, which is the natural food of the young animal is rich in protein. Again a cow giving milk requires an abundance of protein, because the feed is the source of the protein of the milk. It is true that a horse, for instance, may do a greater amount of work than the food fed will furnish energy for, or that a cow will give a larger amount of milk than the food will warrant, but this is done at the expense of the reserve of materials stored in the body, and as a result the horse or the cow becomes thinner.

Another point worthy of mention here is that there is always a certain amount of food required to maintain an animal in a condition that it will neither gain nor lose, for energy must be expended in masticating and digesting the food, circulating blood through the body, etc. If the animal is of a restless, nervous disposition, it will require moore food than if it is of a quiet even disposition. Food must be provided for all these factors before any of it will go to the production of fat or milk, and it is the amount of food that the animal receives over the quantity required for supplying energy for these factors, or over the maintenance diet, as it is spoken of, which affects the gain in body weight or the yield of milk. Consequently, it is evident that there can be no profit in feeding a maintenance diet to a cow giving milk. On the contrary, the aim should be to get the cow to eat a maximum amount of food in order that there may be a large surplus for production. In this way a much smaller proportion of the food goes for maintenance and a larger proportion to production purposes, with a corresponding increase in the profits. Naturally it must follow that the animal which will eat the largest amount of food, and which at the same time is of such a disposition as to require a small amount for maintenance purposes, is the most profitable one.

Composition of Foods.

In the preceding paragraphs we have named the chief constituents of foods and described some of their functions in the animal body. We shall now consider the composition and feeding value of some of the foods, or rather groups of foods in common use.

The feeding value of a food is largely determined by two factors: (1) Its composition, (2) its digestibility. The first of these deals with richness of the food in protein, fat, carbohydrates, and ash materials. The second determines the extent to which these various constituents become available in the body. A knowledge of the composition of a food is important if it is to be used intelligently. In the light of previous statements, we naturally consider those foods which contain the largest amounts of the protein and fat and the smaller percentage of fibre as the most valuable. The following table gives the percentage amount of the various food constituents present in a number of the most common foods:

THE PERCENTAGE AND COMPOSITION OF SOME OF THE DIFFERENT CLASSES OF FOODS.

Green Fodders.	Water.	Ash.	Protein.	Fibre.	Nitrogen free extract.	Fat.
Corn	79.3	1.2	1.8	5.0	12 2	0.5
Sorghum, whole plant	79.4	1.1	1.3	6.1	11.6	0.5
Rye fodder	76.6	1.8	2.6	11.6	6.8	0 6
Oat fodder	62.2	2.5	3.4	11.2	19 3	1.4
Red top	64.8	2.3	3.3	9.4	19.1	1.2
Tall oat grass	69.5	2.0	2.4	9.4	15 8	0.9
Orchard grass	73.0	2.0	2.6	8.2	13.3	0.9
Meadow fescue	69.9	1.8	2.4	10.8	14.3	0 8
Timothy	59.4	2.3	2.9	12.6	21.5	1.3
Kentucky blue grass	69.1	2.4	3.2	8.3	16.1	0.9
Red clover	72.7	2.2	4.3	6.5	13 4	0.9
Alsike clover	74.8	2.0	3.9	7.4	11.0	0.9
Alfalfa	71.8	2.7	4.8	7.4	12.3	1.0
Cowpea	83.6	1.7	2.4	4.8	7.1	0.4
Soja bean	74.8	2.4	3.0	7.3	11.5	1.0
Corn silage	79.1	1.4	1.7	6.0	11.1	0.8
Hay and Dry Coarse Fodders.						
Corn fodder, field cured	42.2	2.7	4.5	14.3	34.7	1.6
Red top	8.9	5.2	7.9	28.6	47.4	1.9
Orchard grass	9.9	6.0	8.1	32.4	41 0	2.6
Timothy	13.2	4.4	5.9	29.0	45.0	2.5
Hungarian grass	7.7	6.0	7.5	27.7	49.0	2.1
Red clover	15.3	6.2	12.3	24.8	38.1	3.3
Alsike clover	9.7	8.3	12.8	25.6	40.7	2.9
Alfalfa	8.4	7.4	14.3	25.0	42.7	2 2
Cowpea	10.7	7.5	16.6	20.1	42.2	2.9
Wheat straw	9.6	4.2	3 4	38.1	43.4	1.3
Rye straw	7.1	3.2	3.0	38.9	46 6	1.2
Oat straw	9 2	5.1	4.0	37.0	42 4	2.3
Buckwheat straw	9.9	5.5	5.2	43.0	35.1	1.3
Roots, Bulbs and Tubers.						
Potatoes	78.9	1.0	2.1	0.6	17.3	0.1
Sugar beet	86.5	0.9	1.8	0.9	9.8	0.1
Mangel-wurzels	90.9	1.1	1.4	0.9	5.5	0.2
Turnips	90.5	0.8	1.1	1.2	6 2	0.2
Ruta-bagas	88.6	1.2	1.2	1.3	7.5	0.2
Carrots	88.6	1.0	1.1	0 7	9.4	0.3
Grains and other Seeds.						
Dent corn	10.6	1.5	10.3	2.2	70.4	5.0
Flint corn	11.3	1.4	10.5	1.7	70.1	5.0
Barley	10.9	2.4	12.4	2.7	69.8	1.8
Oats	11.0	3.0	11.8	9.5	59.7	5.0
Rye	11.6	1.9	10.6	1.7	72.5	1.7
Wheat, spring varieties	10.4	1.9	12.5	1.8	71.2	2.2
Wheat, winter varieties	10.5	1.8	11.8	1.8	72.0	2.1
Wheat, all varieties	10.5	1.8	11.9	1.8	71.9	2.1
Rice	12.4	0.4	7.4	0.2	79.2	0.4
Buckwheat	12 6	2.0	10.0	8.7	64.5	2.2
Soja beans	10.8	4.7	34.0	4.8	28.8	16.9
Cowpea	14.8	3.2	20.8	4.1	55.7	1.4
Peas	14.0	2.8	22.5	5.4	53.7	1.6

Mill By-Products.	Water.	Ash.	Protein.	Fibre.	Nitrogen free extract.	Fat.
Pea hulls	7.51	2.92	10.04	42.07	36.01	1.44
Mixed grain or chop	11.27	3.96	12.81	11.00	56.35	4.61
Wheat middlings	10.10	3.72	15.54	4.26	62.46	3.92
Wheat bran	10.40	5.14	14.99	8.74	56.99	3.74
Low grade flour	11.02	1.88	11.94	0.44	71.13	3.58
Shorts	9.38	4.37	16.01	4.52	61.26	4.46
Beeswing	6.93	2.29	9.60	18.19	62.58	0.41
Cotton seed meal	5.94	6.91	44.18	4.78	24.54	13.65
Cotton seed hulls	9.73	2.16	4.45	46.60	35.75	1.31
Oil cake	9.06	5.89	30.41	10.64	36.93	7.07
Gluten meal	7.12	0.83	24.96	3.70	54.85	8.54
Gluten feed	8.61	0.82	25.65	5 92	51.47	7.52
Corn chop	9.80	1.40	9.36	1.93	73 04	4.47
Corn bran	5.97	2.20	8.64	16.27	65.90	2.02
Oat bran	8.07	4.90	6.74	29.38	49.75	1.16
Oat dust	9.75	4.15	11.93	12.82	56.58	4.76
Oat siftings	10.37	2.19	14.33	18.36	51.39	3 36
Mill feed	9.91	6.15	7.60	21.00	53.04	2.30
Barley dust	10.62	3.39	14.00	13.93	55.86	2.20
Malt sprouts	8.80	7.12	29.34	16.33	36.62	1.79
Crushed barley	10.23	2.32	11.88	2.92	70.11	2.54
Dried beet pulp	2.94	6.37	8.54	15.17	65.84	1.14
Condimental and Stock Foods.						
Carnafac	7.13	11.23	15.36	13.66	48.99	3.63
Anglo-Saxon Stock Food	7.04	10.06	19.47	14.79	41.35	7.26
Beaver Co's Stock Food	7.60	9.80	19.66	7.90	50.51	4.05
Columbia Regulator	7.42	22.28	10.72	9.52	45.22	5.02
International Stock Food	10.32	16.87	11.06	7.90	52.24	2.61
Myer's Cattle Spice and Cattle Food	7.24	30.43	11.27	8.93	40.24	1.89
Myer's Spice	12.25	18.75	13.42	6.99	45.12	3.47
Dr. Hess's Stock Food	7.48	22.41	12.34	7.37	48.60	1.80
Dr. Scott's Stock Compound	7.20	16.06	14.51	7.26	51.95	2.96
Dr. Scott's Stock Food	11.50	4.49	17.15	5.47	56.21	5.17
Pratt's Animal Regulator	9.21	11.35	9.72	4.21	61.01	4.50
Bibby's Cream	10.15	4.12	13.50	3.92	62.20	6.11
Herbageum Stock Food	7.15	14.03	21.10	9.29	43.61	4.82
Rust's Egg Producer	8.82	61.30	19.03	5.15	1.49	4.21
Dr. Hess's Panacea	10.41	39.04	11.20	3.47	34.13	1.75
Pratt's Horse and Cattle Feed	10.24	6.70	11.63	5.31	63.85	2.27
Calf Meal	10.20	4.61	23.27	5.54	53.87	2.51
Standard	11.50	5.37	14.54	4.61	59.39	4.59
Acme Stock Food	7.42	8.04	23.51	7.04	46.60	7.39
Worthington's Stock Food	8.78	12.15	13.24	11.30	51.28	3.25
Victor Stock Food	9.41	5.22	12.19	12.15	68.67	1.36
Canadian Stock Food	7.88	7.56	14.58	10.55	54.48	4.95
Columbia Stock Food	6.39	22.11	11.56	9.15	46.10	4.69
Molassine	17.91	6.49	7.96	6.16	61.11	0.37
Wadehouse Animal Invigorator	7 80	7.09	24.67	8.64	42.18	9.62

The valuable forage plants of this country belong mostly to two families, the grasses and the legumes. June grass, red top, timothy, and the cereal grain plants are types of the former; and the clovers, alfalfa, and peas of the latter. The most essential difference between the members of the two families of plants when considered as feeding stuffs is in the larger proportion of the protein in the legumes. For this reason they are very justly regarded as the better foods for growing stock and for general use on dairy farms.

With reference to the composition of all green dried fodders and roots, foods that are fed in an immature state, it may be stated that they are liable to considerable variation. We find that the composition depends largely on

the stage of maturity at which they are cut and also upon the character of the manuring. In general it may be stated that as a plant matures the proportion of water, protein and ash matter decreases, while the proportion of carbohydrates, especially of fibrous material, increases. As this latter substance is largely indigestible, fodder crops deteriorate towards maturity. Young grass is much richer in albuminoids and contains a smaller proportion of indigestible fibre than older grass, and is, consequently, more nourishing. The same comparison may be made between young clover and that which is allowed to mature for hay. It follows that fodder crops should be cut for hay before they reach maturity, and experimental work and general experience has fully demonstrated that these crops should be cut immediately full bloom is reached. Alfalfa is an exception to this, because it very rapidly becomes fibrous and should be cut in the early blossoming stage to obtain the best results.

With reference to the root crops, it has been found that while fodder crops deteriorate towards maturity, because of the conversion of soluble forms of carbohydrates into the insoluble and indigestible fibre, root crops, such as mangels and potatoes, improve, owing to the carbohydrates produced in this case being sugar and starch, both of which are of great feeding value.

The advantages and disadvantages of green as compared with dry fodders have been much discussed. After considerating all the data, it seems safe to assert that the compounds of a dried fodder which has suffered no fermentation are practically what they were when in the green, freshly cut material, excepting that nearly all the water contained in the green tissues has evaporated and that in drying there is a possible loss of an imperceptible amount of volatile compounds, whose presence in the plant affects its flavor more or less. It is certain that drying a plant diminishes its palatableness and increases its toughness, thus increasing the work of mastication. It is, however, doubtful if the mere matter of being green or being dry has any decided influence on the nutritive value of the food. However, it is not always possible to dry fodders under perfect conditions and when they are subjected to long-continued and slow curing in rainy weather, fermentation takes place with the probable loss of considerable material.

The root crops do not contain a very large amount of the valuable food constitutents, but, when fed along with the dried fodders, they probably have a food value much greater than their composition indicates. This is due to the increased succulency which they impart to the ration.

The place of grain in the ration is to increase the proportion of protein and other digestible materials, or in other words, to make the ration more concentrated. It is generally agreed that cows of 1,000 pounds weight need approximately 16 pounds of total nutrients daily. Animals that are thin in flesh, especially when fresh in milk, can consume two or three pounds more to advantage. Of these 16 pounds, approximately 2.5 pounds of protein is necessary, in order to enable the cow to produce large and continuous yields of milk. If a cow is fed all hay, she cannot eat enough of the food to obtain the amount of the nutrients mentioned. Thus, suppose a cow should be fed all she can consume of any palatable, dry, coarse fodder, such as good quality of hay, she would have at her disposal the following digestible nutrients, approximately: Protein 1.4 pounds; fat, 0.4 pounds, carbohydrates, 12.4 pounds; total 14.2. It is clear that such a ration lacks in protein, as well as in total digestible matter. In order to overcome these deficiencies, recourse is had to the concentrated feeds, rich in protein, and sufficient is added to increase the protein to the desired amount. This, in brief, is the function of grains and concentrated by-products in the ration.

It is, of course, evident that the cereal grains, as corn, oats, wheat, etc., are not sufficiently rich in protein to very materially increase its proportion in the diet. But these foods are rich in nitrogen-free-extract or carbohydrates, that are easily digested and are very useful when fed along with the coarser foods which contain much fibre.

Pea meal, linseed meal, gluten feed, wheat bran, and middlings are foods rich in protein and are, therefore, most valuable components for a ration intended for dairy cows. On the other hand, it is evident that cotton seed hulls, corn bran, oat bran, and such low grade materials cannot build up the protein side of a ration. They are also entirely unfit to be used as substitutes for linseed meal, gluten feed and such nitrogenous materials.

What has been said serves to draw attention to the point, that when purchasing foods the percentage of protein it contains is of prime importance. The home-grown crops, especially the grasses and cereal grains, are more likely to be deficient in this than in any other constituent, but when clover or alfalfa hay are used as the coarse foods, the use of concentrates especially rich in protein is not so necessary.

The shortage of coarse foods and grains the last few years has been the means of causing many feeders of live stock, particularly dairymen, to consider the advisability of purchasing certain of these mill by-products for which, heretofore, they have had little or no use. There are cases where these foods may be used to advantage, but the purchaser is advised to be on his guard in the selection of these so-called cheap by-products. Frequently the price asked is not in proportion to their food value, and, furthermore, the analyses we have made indicate that they are not uniform in composition.

The last class of foods given in the table of composition are the "Stock-Foods." The figures given there indicate that they have no greater nutritive value than that of the grain of which they are largely composed. Their medicinal value depends largely upon the aromatic seeds and roots used as a tonic for the stomach, or charcoal as an absorbent, and on the purgative effect of epsom and glauber salts. The quantities recommended to be fed are usually so small that very little nutritive effect can be expected unless the material be fed for a considerable length of time. While it is probably true that some of these stock foods may prove beneficial under certain conditions, it is also true that many of them are heterogeneous mixtures, which from a nutritive standpoint, are in most, if, indeed, not in all cases not worth more than many of the by-products from our mills.

Digestibility of Foods.

In the preceding paragraphs we have dealt with the amount of the different nutrients present in foods. But this alone is not all we should consider in valuing a food, for it is only that part which is digested and absorbed which nourishes the body. It is a much more difficult matter to determine the digestibility than the composition of foods. There are many reasons for this. One animal will digest food much more thoroughly than another, and consequently, the figures obtained from a digestion experiment with one animal would not be correct for the other. Again the same food, especially among the fodders, will vary in composition depending on the stage of maturity at which the plant was cut, the soil upon which it was grown, and the nature of the season. It is also true that it is within the power of the feeder to so manipulate the food or vary the conditions under which it is fed that the extent or completeness of digestibility is modified. Further,

it is reasonable to believe that a thorough relish for food is conducive to good digestion. The experienced feeder knows well the value of making the food attractive or palatable. An agreeable flavor or taste adds nothing to the energy or building of a food, but it does tend to secure its thorough digestion. Without doubt, the success of one feeder as compared with the failures of another may sometimes be due, in part, to a superior manner of presenting the food to the animal and to manipulations that add to the agreeableness of its flavors.

It will be seen from the above that all that can be hoped is to determine the digestibility of the more common foods under average conditions. When the figures thus obtained are studied along with those given in the table of composition, they are of great assistance to the feeder in forming a correct idea of the value of a food.

The following table, compiled from several sources, gives the percentage amount of each constituent digested. In most cases the figures given are the average of a large number of experiments:

Per cent. of the Various Food Constituents Digested.

	Organic Matter.	Protein.	Fibre.	Nitrogen free extract.	Fat.
Corn fodder	70.7	56.1	55.8	72.2	73.9
Corn silage	73.6	56.0	70.0	76.1	82.4
Sorghum	69.0	46.8	59.0	74.6	74.2
Soy Beans	64.5	75.1	47.0	73.2	54.1
Red Top	68.1	67.0	52 6	77.6	64.5
Orchard grass	57.8	59.5	60.4	55.4	53.8
Timothy	57.9	46.9	52.5	62.3	52.2
Hungarian grass	66.3	60.0	67.6	67.1	63.9
Red clover	68.1	67.0	52.6	77.6	64.5
Alsike clover	63.2	66.1	53.5	70.7	50.2
Alfalfa	60.7	72.0	46.0	69.2	51.0
Cowpea	60.0	64.8	42.0	70.6	51.8
Wheat straw	43.0	11.0	52.0	38.0	31.0
Oat straw	52.0	.....	57 6	53.2	38.3
Potatoes	77.0	44.7	.....	90.4	13.0
Sugar beets	98.7	91.3	100.7	99.9	40.9
Mangels	88.0	77.0	.....	96.0	.....
Turnips	96.1	89.7	100.3	96.5	87.5
Ruta-bagas	91.1	80.3	74.2	94.7	84.2
Barley	67.5	71.8	60.8	71.2	59.9
Oats	60.9	71.8	52.8	62.6	69.2
Rye	75.3	79.4	79.2	70.1	74 5
Mixed grain or chop	.....	73.27	51.0	69 4	49.6
Wheat middlings	78.5	79.8	33.1	81 3	86.3
Wheat bran	60.7	75.8	18.3	64.3	45 0
Cotton-seed meal	76.1	88.4	55.5	60.6	93.3
Cotton-seed hulls	40.5	.....	40.0	41.1	85.7
Gluten meal	90.4	88.2	.....	89.8	94.4
Gluten feed	87.3	85.6	78.0	89 2	84.4
Corn bran	.....	52.2	25.8	68.2	67.2
Oat dust	.....	67.1	32.3	66.7	77.2
Mill feed	.....	55 3	48.9	72.3	66 9
Barley dust	.....	60.2	37.2	54.6	73.4
Malt Sprouts	67.2	80.2	32.9	68.1	104.6

At one time it was thought that curing or drying a fodder caused a decrease in its digestibility. Digestion experiments on this continent and in Germany have abundantly demonstrated that, while this is true, the

difference is but slight. It seems probable that in general practice there is more or less unavoidable fermentation and loss of the finer parts of the plant, and, that the slight decrease in digestibility is due to this and not necessarily to the mere drying of the fodder.

It is evident that the foods containing the largest amount of fibre are least digested. The fibre itself is largely indigestible, and it is so mixed with and surrounding the other constituents of the food that it prevents the digestion of these. Thus the coarse fodders, wheat and oat straw and oat hulls, are not fully nor are they easily digested.

Some very interesting and instructive results on the energy required to digest coarse foods have been comparatively recently published by Dr. Kellner, a German investigator. He has shown that the labor of digesting straw is so great that the portion actually digested is so largely consumed in providing the energy demanded to do the work of digestion that, in the case of the horse, there was no balance remaining for other animal requirements, while, in the case of the ox, only 17.8 per cent. of the energy of the digested straw was finally available for the production of animal increase or external work. This does not mean that straw should not be fed, for particularly when fed to animals that are to be simply maintained as they are without gaining nor losing or doing work, it has a distinct value, as will be shown later.

Comparative Nutritive Value of Foods.

A statement of the quantity of protein, fat, and carbohydrates, or even the amount of these constituents ordinarily digested in a food does not sufficiently indicate its nutritive worth. This is because of the unequal value of the protein, fat and carbohydrates, the unequal losses which take place during the processes of digestion and assimilation, and the unequal labor which the process of digestion requires in various cases.

The only common function of food constituents which can be used for figuring comparative value is the capacity for producing heat in the body. The objection to this method is that the amount of heat which a food is capable of producing when burned does not necessarily express its power of increasing or renewing the protein matters of the body, this depends solely on the amount of the albuminoid constituents of the diet, for, as has been already pointed out, the building up and renewing of muscle, blood, etc., in the body is the particular function of the albuminoids. It is quite probable that the amount of heat generated by the combustion of the digestible constituents of any food, after making corrections for the points referred to, will form a true guide to its nutritive value whenever the diet of which it forms a part supplies a sufficient amount of digestible albuminoids, and this will be the case whenever foods are skilfully employed. But it may be pointed out that the value of any food to an animal may be quite different according as it is employed for purposes of maintaining the condition of the animal when at rest, or when employed for the production of increase or for the performance of external work.

Without going into the reasons for the above statement, nor into the method of calculating the comparative value of foods on the basis of their power to produce heat, I give the comparative figures found in Warington's "Chemistry of the Farm."

COMPARATIVE VALUES OF ORDINARY FOODS FOR OXEN AND SHEEP.*

	For Maintenance.		For Production	
	Value of 1,000 lbs. expressed as starch.	Quantities equivalent to 1 lb. of starch.	Value of 1,000 lbs. expressed as starch.	Quantities equivalent to 1 lb. of starch
	lbs.	lbs.	lbs.	lbs.
Cotton cake (decorticated)	944	1.06	826	1.21
Maize	859	1.16	825	1.21
Wheat	823	1.21	783	1.28
Linseed cake	842	1.18	733	1.36
Barley	755	1.32	721	1.39
Rice meal	758	1.32	713	1.40
Peas	796	1.25	702	1.42
Beans	786	1.27	670	1.49
Oats	676	1.48	626	1.60
Wheat bran	635	1.57	578	1.73
Brewer's grains (dried)	634	1.58	533	1.88
Malt sprouts	695	1.44	518	1.93
Cotton cake (undecorticated)	519	1.93	442	2.26
Meadow hay (best)	536	1.87	359	2.79
" " (medium)	505	1.98	337	2.97
Clover hay (medium)	459	2.18	319	3.13
Meadow hay (poor)	479	2.09	294	3.40
Bean straw	421	2.38	252	3.97
Oat and barley straw	412	2.43	207	4.83
Potatoes	212	4.72	202	4.95
Mangels (small)	108	9.26	99	10.10
Wheat straw	357	2.80	96	10.41
Maize silage	131	7.63	92	10.87
Clover (bloom beginning)	131	7.63	92	10.87
Mangels (large)	87	11.49	76	13.16
Swedes	86	11.63	75	13.33
Turnips	68	14.71	59	16.95

*To obtain the maintenance value in terms of starch, the method employed was to multiply the weight of the digestible constituents in 1,000 pounds of the food by the following factors and add the results together:

Albuminoids × 1.25 + amides × 0.6 fat × 2.3 + carbohydrates + fibre.

To obtain the production value in terms of starch, the calculation was:

Fat × 2.3 + albuminoids + carbohydrates.

The totals obtained by these calculations express the value of each food, both for maintenance and production purposes in terms of dry, digestible starch. The table also shows what weight of each food is equivalent in effect to 1 pound of starch.

The above figures show that an equal weight of any of the grains or linseed cake have a nearly equal feeding value if supplied to an animal receiving a sufficient amount of abuminoids in its diet, as, for instance, if given to sheep or cattle on grass or clover. The table also shows that while the grains, potatoes, and root crops are nearly as valuable for production as for maintenance purposes, wheat straw and all other fibrous materials are not.

On the other hand, the value of linseed cake and the cereal grains would not be so nearly alike if the ration to which they were to be added was poor in protein. In this case the increased quantity of protein in the oil cake would have a direct value in rendering the whole ration better; and we would be getting a return from the oil cake which would not be included in the heat equivalent.

The practical value of any food must depend, in a great measure, on the condition under which it is employed. Thus the value of a bulky food,

as hay or straw, is far greater when given to a ruminant animal than when consumed by a horse or pig. Concentrated, easily digested foods, as grains or oil cake, have clearly a value above their composition when added to a poor and bulky food, as straw chaff, or to a watery food like turnips, because they are the means of raising the quality of the diet to a point at which the animal will thrive. On the other hand, roots and green fooders, even when watery and poor in composition, may have a considerable effect when added in a moderate proportion to dry food. The highest value is, in short, only obtained from food when it is skilfully employed.

There is another factor which we can never hope to express in figures, but which has considerable influence on the effect of any diet; this is flavor. An agreeable flavor stimulates appetite and, as has been stated, probably promoted digestion.

The general practical lesson to be drawn from a study of the comparative values of food is that many foods can be substituted for each other without altering the value of the whole diet. A farmer should be able to introduce economy into his feeding by watching the market and making use of those foods which are cheapest. For example, a farmer may have been accustomed to feeding a certain mixture of grains to his fattening stock. If for some reason or other, one of these grains has advanced in price, by studying the composition and comparative value of other foods available, he might be able to sell the high priced grain and purchase some cheaper substance which will fulfill all requirements.

As has been shown, the comparative value of foods is a large and complicated subject, one that cannot be fully discussed in this article, yet, if we may judge by the number of letters received, it is a subject which is receiving considerable attention by the stock feeder, especially those who are inclined to use the mill by-products. We have determined the composition and digestibility of a large number of these Ontario by-products, and we are in a position to give information concerning them. It is obvious, however, that before we can give the comparative values of these foods, we must know something about the kind of stock to which it is to be fed, the foods it is to be fed with, the purpose for which the animals are being fed, that is, whether growth, fattening, milk, or work is the object; and the market prices of the foods to be compared. Given this information we will be only too glad to give any assistance we can to correspondents.

Much might be written with reference to the value of feeding standards, especially to the inexperienced feeder who may wish to know whether the ration he is using is in accordance with the practice of the best feeders, but this would require to be treated fully to be of value and will have to be left for some future time.

ONE YEAR'S INFLUENCE OF THE SIZE OF SEEDS ON THE YIELD OF PLANTS OF FARM CROPS.

By C. A. Zavitz, Professor of Field Husbandry, Agricultural College, Guelph, Ont.

Within the past fourteen years, a large amount of experimental work has been done to determine the influence of different selections of seed upon the resulting crop. From the numerous experiments which have been conducted at our College on seed selection, only those bearing directly upon the size of the seed sown are here presented. The various experiments include grains, potatoes, field roots, and rape.

For the grain experiments, fresh seed was taken each year from the general crop of grain grown in the large fields, and for the experiments with field roots and rape, seed of the leading varieties, which was obtained from prominent seedsmen, was made use of. It will therefore be understood that the results represent simply the one year's influence from seed selection, but in order to ascertain the influence from one year's work of this selection, the experiments were repeated from season to season in order to secure a good average of conditions of soil, temperature, and rainfall. For the large sample, none but well developed seeds were selected; for the medium sized sample, the seeds selected were of a uniform character, plump, and of medium size; and for the small sample, none but sound, plump, and apparently good seeds of small size were used. The selections were made with great care by the use of sieves and then by hand-picking the seeds, so that all the seeds of each selection would be very uniform and true to its particular selection.

Grain Crops.—In the selection of large, plump grain, a sufficient quantity of each class to sow a plot twenty-five links square was carefully weighed out, after which the grains were counted. A corresponding number was then taken of the medium sized seeds of oats and of small, plump seeds of oats, barley, spring wheat, winter wheat, and field peas. The different selections were sown upon plots of similar size.

The following table gives the average results obtained from the various selections of grain crops sown for six, seven, and eight years in succession:

Seed Grain Selections.

Class of grain.	Number of years that tests have been repeated.	Selections.	Weight of grain per measured bushel.	Tons of straw.	Bus. of grain (by weight).
Oats	7	Large seed	33.2	1.9	62.0
		Medium sized seed	32.2	1.8	54.1
		Small seed	31.8	1.8	46.6
Barley	6	Large plump seed	49.5	1.5	53.8
		Small plump seed	48.8	1.5	50.4
Field peas	6	Large seed	56.3	1.3	28.1
		Small seed	56.3	1.1	23.0
Spring wheat	8	Large plump seed	59.1	1.4	21.7
		Small plump seed	58.3	1.3	18.0
Winter wheat	6	Large plump seed	59.4	2.6	46.9
		Small plump seed	59.2	2.2	40.4

The average results here presented in tabulated form show that in every instance the largest seed produced the greatest yield of grain. In no case did the smaller seed produce a greater yield of straw or a greater weight of grain

per measured bushel than the seed of a larger size, but in three instances the results were similar.

On making an examination of the detailed results, it was found that in forty separate tests made with seed grain of different sizes, the greatest yield of grain per acre was produced from the larger seeds in thirty-seven of the tests, from the smaller seeds in two of the tests, and the yields were equal in one test.

Root Crops.—Four tests were made annually with the different selections of seed of field roots. Duplicate experiments were conducted in which the seeds of the different selections were planted separately, and duplicate experiments were also conducted by planting three large, five medium, and eight small seeds at each place where it was desirable for a root to grow. The plants were afterwards thined, leaving one plant in each place and having the plants of the different selections of each class at an equal distance apart. When the roots were harvested the yields of the duplicate tests of each method were averaged.

The following table gives the average results of the duplicate tests made by means of each of two methods of comparison, in order to ascertain the amount of the influence of the size of root seeds on the size of the roots produced:

SELECTION OF SEED.

Methods of planting.	Classes of roots.	Number of years of test.	Large seed (tons).	Medium seed (tons).	Small seed (tons).
Plots in which equal numbers of seeds were planted separately	Mangels	5	31.19	27.02	18.57
	Sugar Beets	5	23.25	21.32	13.48
	Swede Turnips	5	15.35	12.63	7.03
	Fall Turnips	4	25.27	20.78	12.90
	Field Carrots	5	23 32	19.31	13.59
Plots in which equal numbers of plants were left when thinning	Mangels	5	35.17	32.23	24.47
	Sugar Beets	5	22.54	22.37	15.05
	Swede Turnips	5	18.77	17.85	10.40
	Fall Turnips	3	22.98	22.23	22.48
	Field Carrots	5	26.62	25.13	18.87

NOTE.—In the case of Mangels and Sugar Beets the seed clusters instead of the separate seeds were used.

In the foregoing table there are no less than ninety-four distinct experiments conducted with large, medium sized, and small sized seeds of five distinct classes of roots. In fully eighty-five per cent. of the separate tests the larger seeds yielded more heavily than the smaller seeds.

Field Rape.—From good average samples of commercial rape seed, large, medium, and small sized seeds were selected for experimental testing in each of five years. In each of the years, large seed was sown on one plot, medium sized seed on another plot, and small seed on still another plot, and the test was conducted two, three, or four times each season, usually the latter. For this experiment, the seed was sown quite thickly in rows three and one-third links apart, and when the plants were about two inches in height, they were carefully thinned to equal distances apart, thus leaving exactly the same number of plants in each plot, the object being to ascertain the comparative value of seeds of different sizes for crop production.

The average results in tons of green rape per acre obtained from the different tests in sowing rape seed of different sizes in each of five years are given in the following table:

Selections.	1895	1896	1897	1900	1901	Average 5 years
Large seed	13.1	27.5	17.7	6.6	21.9	17.4
Medium seed	9.2	26.5	16.1	5.3	18.0	15.0
Small seed	3.3	26.5	14.2	1.2	16.8	12.4

In each of the years, the large seed produced the largest crop and the small seed the smallest crop, except in 1896, when the medium sized seed and the small seed gave equal results. In the average results of all the tests conducted in five years, the large seed gave fully forty per cent. heavier yields of green rape than those produced by the small seed.

Potatoes.—In the case of Irish Potatoes, selections were made of the tubers instead of the seeds. Equal numbers of large, medium, and small marketable potatoes were carefully selected and were then planted whole at equal distances apart on plots of similar size. The rows were three and one-third links apart, and the potatoes were planted one foot apart in the rows. The tests were made in duplicate in each of two, and in triplicate in each of four years. Both early and late varieties were used, the greater number being late.

The average results in yields of potatoes per acre from the different tests made in each of six years are given in the following table:

Selections.	1892	1893	1894	1895	1896	1897	Average 6 year
Large potatoes	239	256	463	403	323	345	338
Medium potatoes	189	226	381	317	240	289	274
Small potatoes	93	179	353	208	155	219	201

In each of sixteen tests made within the six year period, the large potatoes yielded more than the medium, and the medium potatoes yielded more than the small marketable potatoes.

Conclusion.

From the numerous experiments which have been conducted at the Ontario Agricultural College within the past fourteen years, it seems very evident that large seeds will give a greater yield than an equal number of small seeds, in the case of each of at least twelve different classes of farm crops. The writer expects to start additional experiments in 1909 with the object of ascertaining the comparative and the maximum yields which can be produced from large numbers of seeds of different sizes by using different quantities of seed of each size.

SOME AGRESSIVE WEEDS.

By T. G. Raynor, Ottawa.

Of the real losses sustained by farmers through the prevalence of weeds, something is known, but not all. The labor problem which has been a serious one for some years, has handicapped many a farmer from doing what he really felt he should do in checking the growth and spread of noxious weeds. Many farmers under modern conditions are attempting to work more land than they can really work well, and while they may be good soil tillers, they lack the time and force necessary to corral their enemies, the weeds.

Climatic conditions have much to do with the spread of weeds. Take, for instance, the quack or couch grass. In a wet season, cultivation, unless very effective, helps to spread it. In a season like the one just closing, a very dry one, this weed could have been hit a hard blow, and it was, in very many cases. Many farmers report they have practically exterminated it in some fields this year. While it may have been well done over the field, in too many cases these underground root stalks have found their way into the fence corners, around stones and stumps; and unless these sources of supply are closely watched, it will be only a question of time when this grass may make its appearance in all its old time force. When a field is cleaned up well by summer fallowing or otherwise, the farmer usually seeds it down, which is good practice if it be not left too long in grass. Two years is plenty long enough to leave in meadow where couch grass has been bad and often one year is all it should be left. To leave it longer is to allow a good supply of couch roots to get started once more.

Without going into detail about this weed, it may be remarked that the most effective methods for its extermination are what might be termed the smothering process. This may be effected by cultivation alone, in not allowing any growth to appear above the surface; or it may be by both cultivation and the growth of such crops as hoe crops, which involve much cultivation, and buckwheat or millet, which are rapid, heavy, late growing crops, and which follow good clean cultivation.

I believe, that there is no disputing the case that couch grass while a very old weed, is still very aggressive, and causes more annual loss to the formers of Ontario in diminished crops and excessive labor than perhaps any other weed.

In heavy soils a close second is found in the rapid-spreading and pernicious weed called the perennial sow thistle. This weed is of late years causing many farmers serious concern. Where allowed to go to seed, the wind so easily spreads it, with its parachute attachment, all over the district that it becomes a serious menace to the best farmers in those districts. The better the land is worked the better is the seed bed, not only for cereal crops, but for weed seeds which by chance may come that way. This weed is of such a serious nature in occupying the ground to the disadvantage of other crops; and when once located is such a persistent grower and spreader through its root stalks, like couch grass, that it is the opinion of many farmers that they should have an effective law to prevent this weed maturing seeds in any quantity each and every year. In this way it could be confined to narrower bounds and in time could be as effectively handled as we are now handling the Canada Thistle, whose manner of growth and spread is similar.

The most effective method for the eradication of this weed is to weaken its underground root stalks by keeping in meadow either for hay or pasture and then follow with hoe crop or some other smothering crop in which a good deal of preparatory cultivation is given. A very useful implement for this

purpose has been found to be the broad shared cultivator which does effective smothering work on all weeds and does it very rapidly. With this weed in a community, careless farming becomes a menace to the whole surrounding country.

Another aggressive weed which is even more persistent and harder to exterminate than either of those already mentioned, but which does not spread very rapidly, is the Field Bindweed or Wild Morning Glory. There are on a great many farms throughout the Province small patches of it, and the farmers do not usually know what it is. Yet it is spreading more or less. Very drastic measures should be taken with these patches at once, such as covering them with plenty of salt, smothering with tar paper or a good depth of fine stable manure. Hoe crops two or three years in succession, well cared for, should handle it. Until such time as effective measures can be taken, it should be left in sod.

Another bad weed for spreading is the simple annual, called common Ragweed. It grows so late in the season that it is often neglected. It is becoming a very common sight in many parts of the Province to see the lower portions of fields, and often the higher parts as well, almost black with ragweed. Very much of its spreading in this way could be checked in stubble lands by plowing or cultivating immediately the fields or parts of them are cleared at harvest time, or on land that is seeded, by running the mower over them and clipping off the growth before the seed has had a chance to form.

Where sufficient cultivation is given to deal effectually with the foregoing weeds, nearly all the other kinds will be dealt with in the cultivated fields quite effectually. There are some weeds which flourish on the roadsides and in waste and unbroken pasture lots, which deserve some mention. One of these is the Blue Weed. It is spreading very rapidly in sections where much rough lands obtain. While it is a biennial and if prevented from going to seed, like the burdock, it would soon die out; yet it is being neglected, and as a result is not only unsightly on the roadsides, but is invading some of the cultivated fields as well.

Another unsightly roadside weed, except when in blossom, is Chicory. It is a deep, strong-rooted, perennial, which is spreading very rapidly along the roadsides and in neglected places. The time to take this plant is when it first appears in the locality. Preventive measures are better than curative ones with this plant. When first seen, if they were spaded out and a little salt put on the root, it would kill the plant. It is necessary to apply something to the roots which will kill them.

Other weeds on the roadside, very unsightly, but not nearly so common as the foregoing, are Elecampane and Teasel. Every farmer in districts where hay was imported last winter should keep his eye open for the first appearance of a plant called Orange Hawk Weed. It is a worthless perennial plant and spreads rapidly in meadows or unbroken lots. Not even sheep will eat it.

Added to the dangers from the above mentioned weeds, already in our midst, mention might be made of those which were very likely introduced in quantity last winter, in bringing into this Province so much of the frozen feed from the Western Provinces. This feed wheat contained more or less seeds of Wild Oats, Pennycress, Hare's Ear Mustard, Wild Buckwheat, etc. Wild Oats and Wild Buckwheat are already too common, but the others are not so common in this Province.

In the fight against weeds, farmers should find the bulletin on the "Farm Weeds of Canada" issued by the Seed Branch, a copy of which may be found in every rural school and Public Library in the Province, a great

help. We wish to solicit the co-operation of every school boy and girl in the great enterprise of housecleaning the country of noxious weeds.

If we do not run the weeds, the weeds will run us. One more thought in closing and that is we can not be too careful in selecting well our seed supply of small and large seeds alike and see that they are as free as possible from noxious weed impurities.

THE FARMER'S VEGETABLE GARDEN.

By A. McMeans, O. A. C., Guelph.

The real value of the farm lies not in its monetary value alone, but in the enjoyments and comforts derived from our work and life on the farm, as well as the lessons we learn through contact with the soil.

One of the chief sources of pleasure and profit, but which is absent from so many of the farms of this Province, is the farmer's vegetable garden. The advantages of a vegetable garden on the farm, may be briefly summed up as follows:

Health. Many people speak of vegetables as being "healthy" without knowing what they mean. The fact is that some of the garden vegetables actually do contain medicinal properties. Spinach contains iron. Asparagus acts on the kidneys. Lettuce contains a narcotic that induces sleep. Celery contains a nerve stimulant, and other vegetables have their uses. Compare the clear skin and firm flesh of a person accustomed to a variety of vegetables, with that of a person whose diet is largely pork and potatoes, with an occasional dish of turnips, and you will have no doubt as to vegetables being a most wholesome food.

Economy. The use of fresh vegetables will effect a considerable saving on the meat bill, even with a small family. In the home garden, vegetables are not subject to exposure on the markets or in transportation. Many of the garden products lose some of their characteristic flavor when not used quickly, and are more valuable when fresh. The home garden is directly under control.

Comfort. The home vegetable garden is a comfort to the home. In many cases interest in the garden is manifested by the women of the household, who realize its value from this standpoint. It can often be made a means of helping to keep the boy on the farm by encouraging him to minister to the comfort of the family through a well kept, profitable garden.

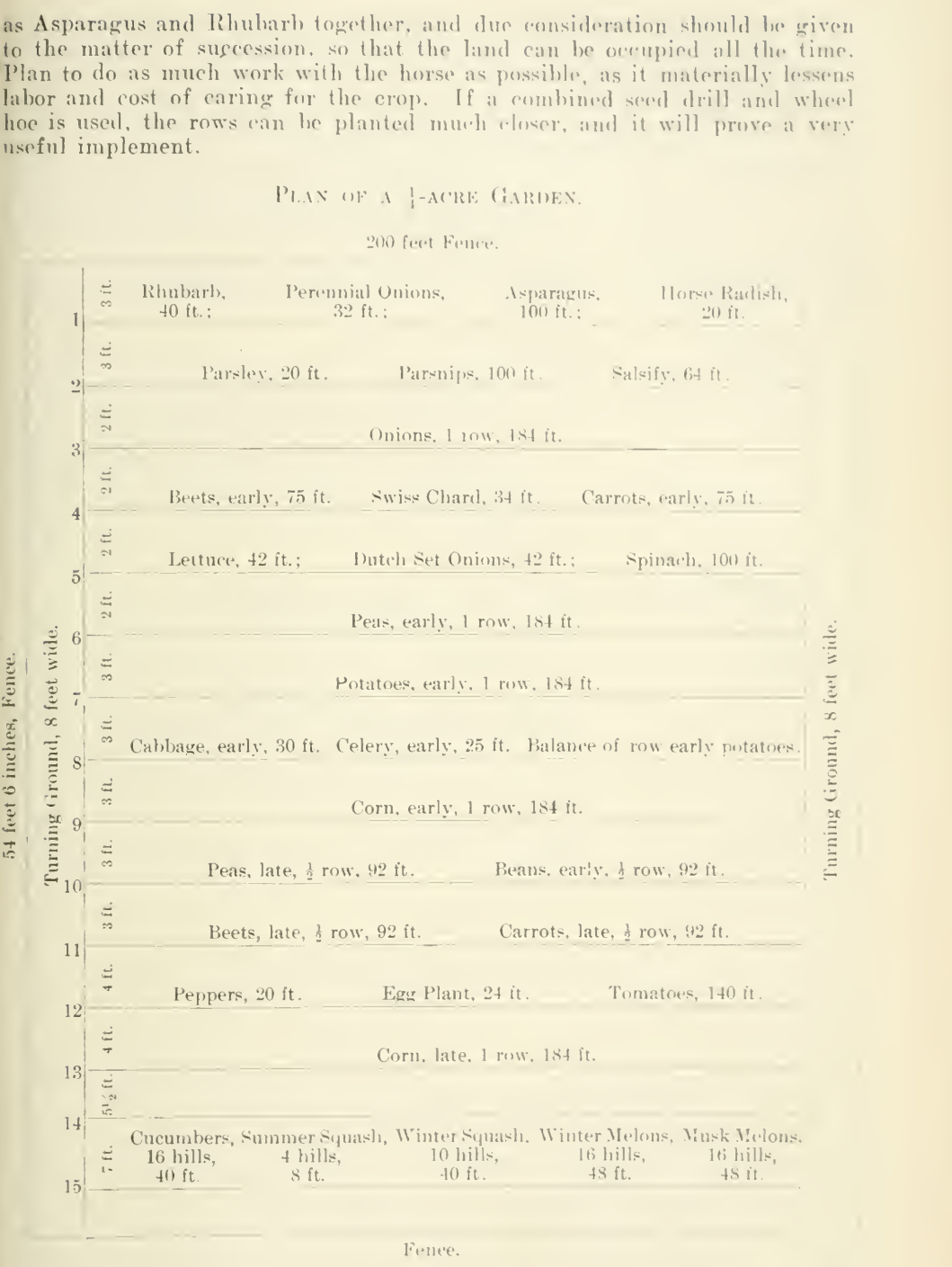
Better Farming. It leads to better farming. From a careful observation the statement can be made that a well kept garden yields from ten to fifteen times greater than general farm crops on the same area. A half-acre garden can be made to produce at least $100.00 worth of vegetables. Of course the garden is well manured and fitted to start with. Before long the farmer notices the difference and wonders at it, and the chances are that very soon he will be practising intensive farming on his general farm crops also.

The location of the garden should be near the dwelling, as the work of caring for it is quite often done at odd times, and also for convenience in procuring a fresh supply of vegetables.

Natural or other drainage is imperative. If it has a slope to the south or south-east it will ensure earlier maturity of crops. It should be protected on the north or north-west by hedges or buildings, or a good tight board fence will answer. This will also serve as a protection from live stock and chickens. The management should be planned so as to have all permanent crops, such

as Asparagus and Rhubarb together, and due consideration should be given to the matter of succession, so that the land can be occupied all the time. Plan to do as much work with the horse as possible, as it materially lessens labor and cost of caring for the crop. If a combined seed drill and wheel hoe is used, the rows can be planted much closer, and it will prove a very useful implement.

PLAN OF A ¼-ACRE GARDEN.


200 feet Fence.
1
3 ft.
Rhubarb, 40 ft.; Perennial Onions, 32 ft.; Asparagus, 100 ft.; Horse Radish, 20 ft.
2
3 ft.
Parsley, 20 ft. Parsnips, 100 ft. Salsify, 64 ft.
3
2 ft.
Onions, 1 row, 184 ft.
4
2 ft.
Beets, early, 75 ft. Swiss Chard, 34 ft. Carrots, early, 75 ft.
5
2 ft.
Lettuce, 42 ft.; Dutch Set Onions, 42 ft.; Spinach, 100 ft.
6
2 ft.
Peas, early, 1 row, 184 ft.
7
3 ft.
Potatoes, early, 1 row, 184 ft.
8
3 ft.
Cabbage, early, 30 ft. Celery, early, 25 ft. Balance of row early potatoes.
9
3 ft.
Corn, early, 1 row, 184 ft.
10
3 ft.
Peas, late, ½ row, 92 ft. Beans, early, ½ row, 92 ft.
11
3 ft.
Beets, late, ½ row, 92 ft. Carrots, late, ½ row, 92 ft.
12
4 ft.
Peppers, 20 ft. Egg Plant, 24 ft. Tomatoes, 140 ft.
13
4 ft.
Corn, late, 1 row, 184 ft.
14
5½ ft.
15
7 ft.
Cucumbers, 16 hills, 40 ft. Summer Squash, 4 hills, 8 ft. Winter Squash, 10 hills, 40 ft. Winter Melons, 16 hills, 48 ft. Musk Melons, 16 hills, 48 ft.
54 feet 6 inches, Fence.
Turning Ground, 8 feet wide.
Turning Ground, 8 feet wide.
Fence.

Row 5 can be followed by ½ row Celery and ½ row late Beans. Row 6 can be followed by ½ row late Cabbage and ½ row late Cauliflower. Rows 7 and 8 can be followed by Spinach and Table Turnip.

When sowing rows 2, 3 and 4 sprinkle some radish seed of the turnip variety in with the other seeds, they will serve to mark the rows and can be pulled and used before they will interfere with the permanent crops.

Send for some seed catalogues to reputable seed firms, and study them well. As a guide to varieties I would recommend the following:

Asparagus	Palmetto, Argentenil.
Beans	Wax—Wardwell's Kidney Wax and Keeney's Rustless Golden Wax; Green Pod—Valentine and Stringless Green Pod.
Beets	Eclipse.
Cabbage	Early Jersey Wakefield; Danish Ball Head, for late.
Cauliflower	Select Dwarf Eurfurt.
Carrots	Chautenay.
Celery	Paris Golden, Self Blanching, for early; Triumph or Giant Golden Heart, for late.
Corn	Golden Bantam, for quality, or if preferred Cory, for early; Stowell's Evergreen and Country gentleman, for late.
Cucumbers	Davis Perfect, for slicing; Chicago Pickling for pickles.
Egg Plant	Black Beauty.
Water Melons	Cole's Early.
Musk Melons	Rocky Ford and Emerald Gem.
Onions	Yellow Globe Danvers.
Peppers	Neapolitan.
Peas	Nott's Excelsior, for early; Stratagem, for late.
Potatoes	Early Fortune, and Early Ohio.
Radish	White Tip Turnip and Chartier, Chins Rose, for winter radish.
Squash	Crookneck, for early; Hubbard, for winter.
Spinach	Victoria.
Salsify	Sandwich Island.
Tomatoes	Earliana, for early; followed by Chalk's Jewel or Stone.

WHY WE SHOULD UNDERDRAIN.

By F. W. Goble, Woodstock, Ont.

If we only stop to think for a moment we shall be surprised perhaps to observe how much of our want of success in farming is attributable to causes which thorough underdraining would remove. The clover crop for one would have been abundant had it not been badly frozen out and heaved in the spring, while perhaps another man has lost nearly all his wheat crop by a season too wet for his land. A farmer has planted his corn early, and later rains have rotted the seed in the ground, while perhaps a neighbor has been compelled by the same rains to wait so long before planting that the season has been too short, and the crop has not matured before the frost in the fall. Some one else has worked his clayey farm too wet because the season would allow him to wait no longer. It could not be properly tilled and later on baked. So, many of the crops have wholly or partially failed, and all because of too much cold water in the soil.

Too much cold water is at the bottom of most of these complaints of unfavorable seasons, as well as of most of our soils, and it is in our power to remove the cause, and at the same time to add dollars to our bank accounts.

In other words we must underdrain all our cultivated land that nature has not already underdrained, and to a great extent we shall cease complaining of the seasons on these grounds. We shall seldom have a season on thoroughly drained land that is too wet, or even too dry, for underdraining is almost as sure a remedy for a drought as for a flood.

We have three kinds of water in the soil, (1) Free water, *i.e.*, water which will run out of a soil at first opportunity, and which fills all the small spaces in a soil when saturated. (2) Capillary water, that held by attraction by the soil grains and which will not run out, and (3) hydroscopic water which is very intimately connected with the soil particles and thus is hard to remove.

Now, what we want to get rid of is the free water, say to the depth of three or four feet. In the spring the land is full of water, but later on the water table is lowered in all but probably swampy lands, so that we have to depend upon the water held by capillary attraction, and the moisture from the air for our supply of water for vegetation. Under-drained soils are more open and friable than undrained land, and will hold a greater amount of capillary water than the latter. Thus we find that in a drained soil we have more moisture during a dry season than in undrained land, other things being equal.

Imperfect drainage prevents early seeding, and thus shortens the growing season, and the amount of available moisture and plant food derived from the soil; and besides increasing the labor of tillage it shortens the time in which the work can be performed. Although we usually regard drainage as a means of making the land fit for cultivation, that should not be the only object of the work. Rain is the principal source of moisture for the soil and too much moisture is what we are trying to relive, but rain is also a source of fertility not only because it affords the necessary moisture to dissolve the elements of plant food already in the soil, but because it contains in itself or brings with it from the atmosphere, valuable fertilizing substances. Rain water always contains in solution ammonia, carbonic acid gas, and oxygen. Now the ammonia contains as nitrogen, our most expensive manurial ingredient, and when we find that the annual rain fall usually contains from 6 to 8 pounds of nitrogen to the acre, we should be careful to have the water filter through the soil instead of over, so that nothing may be lost to the plant.

The carbonic acid and oxygen are two of the most powerful agents we have in the soil, breaking up many of the otherwise insoluble constituents of the soil, and making them available as plant food. We often hear it said that a snow storm in the spring is as good as a coat of manure, but this depends somewhat upon whether we allow the melted snow to run off over the surface or filter through the soil leaving there the manurial constituents, and those which tend to make plant food available in the soil.

Drainage tends to deepen the soil, and we all know that a deep soil is better that a shallow one because it furnishes a larger feeding ground for the roots. The elements of plant food are not all upon the surface. Many of them are washed down into the subsoil, and still others such as some of the mineral constituents are already in the subsoil. Then in a deep feeding ground the plants stand more firmly, and being deep seated are able to withstand drought. On the other hand, if the soil near the surface is full of water the plants may germinate, send out lateral roots, but none downward, so they will not get their feet wet, and do all right until it becomes suddenly

dry. Then being shallow rooted they are dried up in perhaps a hot dry week or so. Now it may sound contradictory to say that underdrains will prevent drought, when they are primarily to carry off water, but if in the spring the ground is freed from excessive moisture the plants can send their roots downward, then when the dry weather comes the pants are deep rooted, and can draw moisture from below. For instance, Lucerne is said to be one of the best plants to grow in a dry season, but one thing absolutely necessary for successful culture is a dry subsoil, and then it has been known in exceptional cases to send its roots 20 or 30 feet deep into a dry bottom.

If land is underdrained it will be unnecessary to have open ditches, and what so spoils the appearance and convenience of a farm as open ditches. The continual turning during plowing and working the land, and driving around to miss them in harvest time means considerable, without taking into account the waste of land, the harbor for weeds and the work of keeping them open.

One of our worst drawbacks in the spring is the cold soil, and this is especially the case in a wet season. We have not any too much time in the spring at the best to get the soil in proper shape and planted, but when we have such seasons as that of 1907 it is almost impossible to get crops in when they should be. This is caused to a great extent by the excessive moisture. It is more difficult to raise one pound of water one degree in temperature than a pound of any other substance in the soil. As a matter of fact the heat required to warm 100 lbs. of water one degree would raise the same amount of dry sand 10 degrees and clay 7 degrees. Again evaporation cools the soil. It is hard to tell where the heat goes when water is evaporated, but nevertheless it is the case that it requires nearly five and one-half times as much heat to evaporate a given amount of water as it does to raise the same amount of water from the freezing to the boiling point. It does not matter at what temperature the evaporation takes place so much heat is always used. You can easily prove that heat goes somewhere by wetting your hands and going out in frosty weather. They dry off, but become cold immediately.

Heat will not pass downward in water; if, therefore, your soil be saturated with water in the spring, the heat of the sun cannot warm it, and ploughing and seeding must be late. Josiah Parks, one of the fathers of deep drainage in England, found that an undrained peat bog had a uniform temperature of 46 degrees below a distance of one foot below the surface. In June he found the temperature at 47 degrees seven inches below the surface, while the drained portion had a temprature of 66 degrees at seven inches and a temperature of 50 degrees at two feet. It has been found by actual observation that the seed bed of a well drained, well tilled soil will be from 5 to 15 degrees warmer than that of a poorly drained and poorly tilled one.

Drainage lessens evaporation simply by removing the surplus snow and rain water by filtration. It thus raises the temperature of the soil by allowing the sun to warm the soil instead of evaporating the water which really makes the soil colder. As the water is carried off through the underdrains, there is a space left in the soil, and the air, which is a very necessary agent in the liberation of plant food in the soil, and is also required by the roots, enters these small spaces. The air being warmer in the spring than the soil also helps to warm the land. As a good soil will hold about one-half of its own weight by attraction, which cannot be drained out, there is not much fear that gentle summer showers will be wasted by filtration even upon thoroughly drained land, while a way is still open by the drains for the escape of heavy rains.

After all the question is, will it *pay* to underdrain? Drainage is a permanent investment. It is not an operation like the application of manure which we should expect to see returned in the form of saleable crops in two or three years, or five or six at the most, nor like the labor applied in cultivating an annual crop. The question is not, whether drainage will pay in one or two years, but will it pay in the long run? Will it, when completed, return to the farm a fair rate of interest for the money spent? Will it be more profitable on the whole than investment in bank stock or some other fairly safe risk? Let us use an illustration to bring this out more clearly. Suppose it costs $200 to drain thoroughly a six-acre field. Had this been expended in labor to produce a crop of vegetables or small fruits we should get our money back the first year, with a fair profit. Or, in manure, or commercial fertilizers we would expect to get our money out of it in two, three, or four years. But we have been doing permanent work which should outlive us if properly done. Therefore if our drained land should pay a fair rate of interest it is a paying investment. Allowing interest at 6 per cent, this would mean that for the $200 expended we should receive annually $12 more from this six acres than before draining, which would require from two to four bushels of corn, barley or wheat per acre extra to pay the $2.00. Any one who has been kept back in the spring's work because of wet land, or had to replant because the seed had rotted in the ground, or similar troubles, will admit that any land not naturally drained will pay for such investment.

Almost without exception, those who have drained such land as required it, have received nothing less than a paying rate. Usually not less than an increase of 1-6 in grain crops has been received, and often very much more, especially after the ground has been cultivated for a few years, as the effectiveness of a drain increases as the water finds its way into the new channels.

Besides the lands already under cultivation which are rendered more productive by drainage, there are many hill-sides where springs burst out, and flat stretches at the foot of hills which receive the drainage of higher lands, that are entirely unfit for cultivation besides being a nuisance and an eye sore. If, of these wet portions we make by draining good, warm, arable land, it is not a mere question of percentage on capital invested, but whether the land when drained is worth more than the cost of drainage. Surely such land should be underdrained if only for the satisfaction of having a clear field, and besides would it not pay?

I think it is the consensus of opinion that a small farm well worked is more profitable than a large one poorly worked. On the majority of our farms, or certain portions thereof, underdraining will put the land in better condition for work, and will allow work for a longer period of the year. Is money thus spent not as profitable as if used in increasing our acreage?

As no doubt many know, the Department of Physics at the Agricultural College has, during the past few seasons, been of considerable help to many who wishes to underdrain, but were not sure of the best methods to adopt, or whether or not they had fall enough. To any such the Department of Physics will send a man to take the levels of his land, locate drains, and advise as to the best methods to adopt. The only expense incurred for the work would be the railway expenses of the person sent by the Department. Any one needing such assistance would do well to communicate with the College.

LIFE ON THE FARM.

By Wm. Johnson, St. Marys, Ont.

I.—The Natural Life.

The sum of life is to live and be happy. To attain an end so desirable as long life and happiness, opinion regarding what course should be pursued is as varied and apparently incomprehensible as humanity itself. There are several incidental essentials to this object, however, which may be common to all: 1st. good health; 2nd. congenial occupation; 3rd, honesty of purpose and free exercise of the affections. That all mankind do not share in these privileges may not arise from inherent defects in their nature. On the contrary, men in their eagerness for happiness often destroy or relinquish that beneficent fountain from which pure happiness alone can come. In gross violation of natural law they surround themselves with conditions and environment which utterly exclude any possibility of enjoying Nature's external beauty. They divorce themselves from her and must suffer.

Nature is divine in her origin. In appreciating her beneficence and sublime operations for those depending upon her, those qualities in mankind which indicate an affection for her, will by their constant exercise determine the greatest sum of human happiness. There are no defects in those natural laws which have existed from the beginning of all time. Sure as eternity itself they will continue to the end of all time. Men may come and men may go, but the labor of the husbandman will be rewarded for ever. This promise is given to the tiller of the soil and to none other of God's creatures. Let every farmer bear in mind that his calling is set apart by the Creator as first of all callings. Complete harmony and good to all lie at the root of his occupation and extend to the care of all created things. Whenever disorder or unpleasantness come into life they arise from a violation of natural conditions. Wherever Nature's laws are ignored she is inexorable in exacting her penalty to the uttermost limit. It follows then that the farther we remove from man's natural calling as a tiller of the soil, so we are likely to err. If this be true then it must also follow that whatever mode of life brings us closest to Nature must lie nearest to that source from which springs our purest happiness. This, then, is a privilege enjoyed in its greatest degree by the farmer.

I believe an ideal life above all things is to prosecute a congenial calling. Happy is he who has found this on a plot of fertile Canadian soil. Surrounded by Nature in her fairest forms, receiving daily from her beneficent hand ample reward for his labor, walking in paths which heaven designed for men, promised seed time and harvest, if his heart is not then glad within him, the sun shines, earth rejoices and season come and go in vain for him. His soul is out of tune with creation and for him there is but little hope. By keeping in touch with Nature, manhood is constantly renewed. Our spiritual longings having free course, are built up and made strong, that we may become better men. We cannot help but notice in all her operations around us that she is ministering to our comfort and our happiness. As we remove farther from her influence we become more liable to fall into error. Whoever teaches that Nature and error in mankind are inseparable, it seems to me are mistaken. Error in this world was not nor will be consistent with Nature. It has arisen from extraneous circumstances which men have created in a wrong pursuit of happiness. Wickedness in its gross disgust-

ing form is not found on the farm. If it chance to be there (and it is undeniable that it sometimes is) it cannot exist there. It soon crawls in its wretchedness to a centre of population. There it can hide and practise its deceptions among congenial associates.

That farm life is most favorable to good conduct and a pure existence, is a generally accepted fact which needs no explanation from me. Those admirable people of whom Ian McLaren wrote afford indubitable proof of the moral attitude of their lives. Dwelling in thatched cottages, (each on his little farm) they had constant communion with Nature in all her varied aspects. They became like their environment. Their character was moulded in the purity of their surroundings. Only a short distance from these glen people were great cities. In these had gathered together, in spite of religion, learning, moral effort, unselfish charities of the noblest description, a mass of wretchedness, squalor and grossness such as no dweller in a rural district had any conception of. Rural populations know nothing of what is happening every day in great commercial centres, and it is a blessing for all that they do not. If the national life blood has in every age and in all lands flowed from the farm, the Creator has given those who remain there a determined advantage over all others. To remain on the farm therefore is a safe guard to purity. The pure are fittest, and the fittest will survive. It is only those who are trusty that will be trusted. It is only those who are guilty of no wrong that can be truly blest. And lastly, I affirm that the incentives to gross or impure living are, on Canadian farms, reduced to a minimum.

I may be permitted to point out a fact indicating our love of Nature as an inherent principle of life and source of happiness. When summer comes with her train of fruits, flowers and beautiful adornments, what happens? Citizens, whose condition or circumstances will permit of change, avail themselves of it. From comfortable homes and attractive suburban surroundings in the city they go back again to seek enjoyment in that realm whose distinguishing feature is restfulness and repose. That spiritual essence implanted in all men, coexistent with Nature herself, leads us on with irresistible force to those places where she holds her court in quietness and peace. In halls by the riverbank, silvery lake or sequestered glen, amidst rural environment and seclusion, she gives her choicest offerings free to all. There the citizen may patch his solitary tent and breathe again the pure breath of heaven. For a season he leaves his cares of business behind him. He experiences a new delight in contemplating scenes where innocence and peace prevail. Ask him as he emerges from his temporary home on a summer morning: "How fares it with you?" There is but one answer. "This is simply grand. City life is not like this. Why I am being made over anew." He has only so far looked on nature and thus he is healed. His environment has made him a better man or rather appealed to his spiritual nature. All is well with himself and as a matter of course, so it seems, well with every person else. Life is better: men are better: the world is better. It is a fact that in order to have a good life good men surrounding you, and pleasant associations, you must strike the key note in your bosom and all things will join in harmony. Where men are constantly coming into contact with Nature, as all farmers must, their environment is favorable to purity of conduct and healthful existence beyond all others.

It may be said, however, that this change from city to rural life for a time, does not arise from a love of Nature but a love of variety. Variety, it is said, constitutes the charm of life. This may be so, but after all, as rural life is a natural life, the variety offered by rural scenes never degrades. They afford an elevation of spirit in their enjoyment, followed by no depression of

soul. It follows then that as all evolution is onward to a greater good, so the natural instincts of men lead them to forego artificial life and come back to first principles as dwellers on the land. Hence we find men of substance spend their day in the artificial life of the cities, but retire to the country for quietness and rest.

Farm life being truly a natural life, then it must follow that it should be made as attractive as possible in order to retain a large percentage of young people in the rural districts. One would suppose then that a matter so desirable would be a first consideration of all men who are anxious to exalt their country. That it has not been so in years past is a misfortune from which I make bold to say, mankind has suffered. Since it has been recognized that natural or rural life is productive of so much good, its advancement ought to command attention and support from all good men. It is humiliating to know, however, that in progressive Canada even until recent years such has not been the attitude of our prominent men. It is undoubtedly true that until 1870 agriculture was neglected. While progress was made in other branches, while colleges were established and amply endowed, no one raised his voice in favor of that industry upon which Canada's success depends. It is more humiliating still to know that those agencies now introduced for the advancement of agriculture were not appreciated by those whose interest they were designed to serve. It is difficult for us now to believe that in 1873 a petition was presented to the Ontario Parliament from what is undoubedly one of the oldest settled and wealthy counties of Western Ontario, praying the government not to establish an Agricultural College in this Province because it would be inimical to the best interests of the farming community. For long years subsequent to the establishment of Guelph College it was a football for politicians. Among the farming class there are to be found far too many progressive farmers even now who look coldly on innovations made in their behalf, during recent years. I am ashamed to acknowledge that many worthy farmers treat the Farmers' Institute and O. A. C. with ridicule and contempt.

This, however, should not be a matter of surprise. Habit, it is said, becomes second nature or supplants nature. The history of nations point with unerring fidelity to an utter neglect of the agricultural class. It is equally clear that farming as an occupation was considered as a business suitable only for dolts or slaves. Complete ignorance of the wondrous principles underlying agriculture, prevailed. Those mighty operations of nature which excite amazement in the greatest minds of modern times, challenged neither the admiration nor understanding of the farmer. Evolution going on every day under his eye had no interest for him. He pursued his way unimpressed by it all.

Agricultural life has now changed. The manner of thought of a farmer has changed. His discussions on his business with his neighbors have a wider range than formerly. In old days many intelligent men settled as poineers. But that quality in them was at a discount. Physical strength and endurance were at a premium. This is now reversed, thought commands a premium. Under these conditions, our course is clear. We must educate, educate, educate! Let us avail ourselves of the agencies we now have in the Agricultural College and Farmers' Institute. Let every farmer's son in Canada know and be impressed with this fact, that it is he whom natural law holds to account for the elevation and improvement of the race.

But it may be said these agencies are imperfect. Perhaps they are. Perfection implies the limit of possibility. It is not too much to say that we have not reached that point. This I will say, however imperfect they may

be, if the farmers would adopt and carry out methods suggested from time to time by the College and disseminated through the Farmers' Institute, we would at last be on a path leading to greater success.

Agriculture being a natural life it may be well to compare or contrast the advantages appertaining to it, with those conditions which affect and give form to other classes. "Thou shalt earn thy bread by the sweat of thy brow" is an irrevocable edict passed upon all men. Nothing can be accomplished great or small without labor. To enjoy the fruits of honest labor in security and peace is the sum of happiness. It is a mistake to measure success by an accumulation of dollars and cents. While money is a necessity under our present social condition, it is not a panacea for life's ills. While it, to some extent, affords security against want and hardship it does not positively prevent either. There is only one calling in life that while it may not be eminently favorable to an accumulation of great wealth, forms a certain safeguard against famine. The sun will shine, rains descend, and Mother Earth will give her increase for the preservation of man and beast. Agriculture offers a security for means of existence that no other calling can. Financial distress overtakes and throws a dark cloud on all classes of business. Money passes away and leaves its former possessor in poverty. Those in possession of wealth are filled with forebodings of to-morrow's speculations. The toiling masses, dependent upon the energy and enterprise of others, are subject to many vicissitudes that never affect the farmer. He stands alone and as far as the necessities of life are concerned, is independent of them all. Those convulsions that affect trade, such as fashion, style, public utility, or popular caprice, may come up to the farm gate, but they should not enter in. Thousands of deserving artisans may suffer. Distress comes on them, not through misconduct on their part. They can neither restrain nor avert these misfortunes that overtake them, for the exigencies of commerce are inexorable. From whatever cause depression comes, a farmer may not spend as much money, but he has a comfortable home and abundance of earth's best food to eat. That is all he could have if he were worth millions.

In the Old Land, at the close of the American war thousands of industrious operatives in Lancashire were rendered dependent on the world's charity. In all that distress how fared the farmer? Not one of them suffered. They felt the depression in reality about as much as they would feel a street brawl in Timbuctoo. Trade may flourish or trade may fail. Wages may rise and fall. Workmen in centres of population may be constantly employed or they may starve in idleness. Candian farmers know little of these things, except through the paper. During the agricultural depression from 1890 to 1895, which, in my forty years' experience as a farmer in Canada, were the worst, how many agriculturists were pinched for the necessities of life? Without fear of contradiction, I say not one. The farmer sat down every day to his usual fare, the best this earth can afford. He drove out in his carriage to church and market town quite as gay as usual. His wife or daughter procured the same little duck of a hat as in his years of prosperity. No one could tell by looking at the well fed, sturdy looking, self satisfied agriculturist that he was at that moment passing through the greatest depression perhaps that agriculture had ever seen. It made this difference to him and this only. His bank account did not increase so rapidly. His expenditure on improvements was not so great. As far as a good table, good health, full barns and stables were concerned, he stood on his own farm as master and lord above them all.

I affirm then that farm life insuring immunity from the vicissitudes which affect other classes surely must be a desirable one. Let young men and women reared on a farm consider well before giving up an existence insuring such safety as this. Let them consider well before divorcing themselves from its independence, ease and enjoyments, for uncertainty, servitude, and that artificial life which prevails in all great centres of population.

These conditions cannot be too strongly impressed on young people in this country. Agriculture stands and will for ever stand, on a solid foundation. Men and women must work, must procure something to support their mortal bodies. In mills, workshops and mines, an eternal grind goes on from youth to age, from boyhood to the grave. When their day of usefulness has passed in these vocations they are thrown like a piece of rusty nail on the scrap heap. But the farm yields a sure return for labor, and every deserving farmer may look on approaching age without fear.

Beyond these considerations agriculture or rural life is accorded this precedence, that from the farm must come for ever that purity and vitality of life which gives vigor and form to the nation. When there are no farmers there is no country. If agriculture is neglected or falls into decay, the nation falls into decay. Wherever agriculture is progressive the nation will be progressive. This is historically true. This continent, at least that portion of it lying north of Mexico, and especially our own country, amply attest this fact. I believe no other vocation in life affords conditions which satisfy the greatest minds to such an extent. It is somewhat strange also, that while it gives scope to the highest order of human thought no other calling will give larger or surer returns to the humblest intellect or most primitive clodhopper that ever burlesqued his calling.

When George III. was King of Great Britain he was asked to attend a council of state at a critical period of British History. He replied: "Good God, don't be in a hurry! Come along till I show you what splendid cabbages I am raising." Our most gracious Sovereign King Edward looks every inch a farmer. If, therefore, there is anything in a farmer's life lacking dignity, it lies in himself and not in his vocation. The man who holds the plough, holds the force, that holds the world. He stands near to Nature. If she does sometimes frown on his advances, she smiles also on him under cold neglect. Beyond her most profuse favors she gives to him strength of form, energy of soul, and that peaceful contentment which are unknown to any other calling on this earth. These are blessings which I regret to say too many of my brother farmers regard with little acceptance.

In a land with climate and soil suitable for agriculture, what do we find till the farmer comes? In our own Canada there was a nation and a people. But they were savage men living in brutality and filth. There was no progress. The amenities which make life worth living were unknown. There was no seed time and harvest, no sowing in hope and no reaping in joy, no ploughman's whistle or milk-maid's song. There were no farmers!

But the pioneer came and with his strong right arm and invincible courage. We may well say regarding him—*Veni, Vidi, Vici:* I came, I saw, I conquered. His determination was to wrest from Nature her choicest offerings. Canada, until his advent was not a country. It was a piece of earth, where roamed at large, wild and savage beasts and wilder and more savage men. Without the farmer this great country would have remained like a blot on creation, a burlesque on creative power. All the trading speculators of God's earth would never have made a place for mankind to dwell. A wilderness it had been from the beginning of all time. A wilderness it would have remained.

The agriculturist came, however, and what a change! In his train came those agencies which are always hanging in his wake, but never found in advance. If Canada now challenges the respect and admiration of the world, thanks to those pioneer farmers who cut out a pathway for progress. Canadians now look with pride on the achievements of mechanical skill in our country. We glory in the operations of science, the splendid conquests of industry, the magnificent temples raised to worship the Most High, and in our seminaries of learning second to none in this world. We now have charities reaching out to protect misfortune, mitigating the pains of disease, and alleviating sorrow and distress. Let this generation and all succeeding ones remember that the pioneer farmer cleared a way, and with clarion notes through the wildest forests on earth, sounded an advance to it all. Verily, Verily, the man that holds the plough, holds the force, that rules the world.

This being the case then, that class who rendered such service to mankind as those who produced food for them all, should, we think, have received first consideration from the state. Such, I regret to say, was not the case. In order that a state should exist its people must be fed. This admits of no contradiction. And yet all classes appeared to have been protected except the farmer who was a foundation for it all. Institutes and Colleges of learning to teach every conceivable thing except that of producing good food on which men could live have been in existence for centuries.

Canadian pioneers hewed paths for such progress as this world had never seen. They have been the means of creating many avenues for honest labor. They have formulated many vocations by which men could support themselves in moderate comfort and independence. They have revolutionized social conditions and raised men in many directions to higher plains and nobler aspirations. They have been of incalculable benefit to mankind.

I may be permitted to point out, however, that nearly all our greatest progress took its rise exactly at that period when men were being better fed. Prior to that time when agriculture was begun in America, the masses in European countries were starving. Those lands could not produce sufficient food to support their dense populations. Laboring men were fed like swine. The great mass of the people being in poverty, a very small portion of the human intellect was available for discovery or progress. A man on the very edge of death through want can do nothing well. But when this country began to send forward an unlimited supply of good food—what a change! Men who had been living on husks, when they were better fed, developed traits of character that led out into the path of improvement, with an energy and skill which surprised the world. Therefore, from the day men got plenty to eat, progress and discovery has developed so rapidly that we of this age look with wonder and amazement on what we ourselves have accomplished.

During the last half of the 17th century and the whole of the 18th, science has continually proved by her researches that a man's food has much to do with his morals, his life and his character. Good food makes good blood, good men; good men do good deeds, and good deeds are a man's salvation. Hitherto, to improve this world we had begun at the wrong end. We did everything for the poor slave except fill his stomach with good food. Admonitions for his welfare were scattered on every side. So far, it had not occurred to our public teachers that a starving man is not amenable to reason, religion, morality or future punishment. Give the same person plenty of good food and he becomes a better citizen and in any calling in life will be a better man.

Notwithstanding the recognized necessity for a well fed population as a sure means of regeneration and progress, the agriculturists who were really to accomplish this, received no consideration. They were left to strive with Nature as best they could. They were considered as a class having nothing to do with a man's well being. This principle was ignored by our leading men, that to reach a man's soul always enter by way of his stomach. Had this fact been established long years before, this world's progress might have been much greater than it is to-day. The land of redeemed spirits might have had more dwellers therein, and earth would assuredly had many millions of happier people.

No effort was made then to aid the man behind the plow. These impressive gentlemen with college degrees attached to their names floated along on the shoulders of society with ease and complacence. It did not occur to them that an All Wise Providence had given them intellectual powers to lead weaker men to the light. By this means, as heaven had blessed them they would be a blessing to other men and so make this world better for their being born. Nay, some men earned the sobriquet of being great men, who played on the chess board of fate with the blood of agricultural slaves who farmed their land, or staked them and their wretched holdings on a cast of the dice. A farmer then was a mere hind. He pottered away on his hungry acres with such success as might be expected from his knowledge, his opportunities and imperfect appliances. His produce he conveyed to market in creels on a donkey's back. He walked alongside his brother ass forming a team. In European countries some lordling held him as a slave. He was a mere chattel sold with the estate. His dwelling place was not at all equal to a Canadian stable of the present day. His food was not superior to that fed every day to a Canadian sow. It was not till his lord and master found that circumstances were changing and it might be to his advantage to look into the condition of his tenant farmer that progress began to be made. By so doing he might improve his own condition, which was of first importance. If better methods could be introduced into agriculture he might obtain higher rents. He began to improve his tenants, therefore, as he improved his cattle. And it may safely be said with the same idea regarding both. From these motives sprung improved conditions amongst the rural population in Great Britain.

It will be noted there was nothing in these innovations indicating an Agricultural College or Farmers' Institute. These educational factors arose subsequently. They were a natural outcome of superior intelligence and a wider range of thought. They implied a more comprehensive view of natural life. Progressive men were now embracing those principles that underlie the best efforts of a husbandman. An immeasurable field is being opened up in agricultural science which must affect all mankind. Far greater heights must and will be reached in this important calling. No human intellect can foreshadow the outcome of agricultural investigation. We are as yet standing on the shore of a great sea of undiscovered truth. The course of every farmer then is clear. Let him see to it that he stands well to the front in support of every effort made in the interest of agricultural development. Let him be impressed with the dignity of his calling. Let him come forward and support manfully both the Agricultural College and Farmers' Institutes as organizations maintained for his special benefit and material advancement. By adopting this course faithfully the time will assuredly come when all men will be compelled to say, "Verily, Verily, the hand that holds the plow, holds the force that holds the world."

II.—Why Boys Leave the Farm.

In the preceding chapter we have spoken of farm life as a natural life. All other means of gaining a living, being artificial, are liable to many vicissitudes of fortune. Agriculture as a primary basis of existence would survive without any or all of those callings which follow the husbandman. Trade, finance, science, manufactures, in fact every avenue through which human thought or energy is directed and developed are like spokes of a great wheel the hub of which is agriculture. Modern discovery and experimental investigations in agriculture have subjected it to many changes. On evolutionary principles it must move on like any other calling. Industries rise and fall through the action of new agencies. Steam came and filled an important place in the economy of the world. Steam power will pass away and the industries depending on it will be operated by another force. This new agency will be subservient to mankind and to his purposes. But it will be superceded by something else of which as yet no human mind has any conception. No man has a right to say that electricity will end all discovery. Indeed, reasoning by induction, we feel that we are standing on the threshold of far greater achievements. Evolution must go on, and on, and on,—not necessarily as a creative power. Creation was finished in æons long past. But it will develop and transform matter into new forms. It is the privilege therefore of the farmer, and to him alone it is given, that whatever change may come, men must be fed and by his handiwork the life of this world must be sustained.

It seems clear that whatever affects agriculture, affects all people. It is equally clear that notwithstanding its importance, it was left to struggle until recent years unaided and alone. Nay, in some degree it was a vocation despised and those who were engaged in it were considered rude, uncouth dolts not fitted by nature for anything else. Notwithstanding this ignorant assumption, philosophers had long taught that it is the great source of a nation's power. Still no one made any effort to give effect to new principles prescribed for its guidance. The uneducated farmer did what was right in his own eyes with his own acres. By thrift, industry, and moderate desires, he was always able to procure a rough plenteousness of food to furnish his table. This accounts undoubtedly for his docility to some extent. A full stomach while it is not a panacea for all life's ills is certainly a soothing antidote for very many of them. Thus to keep a nation law-abiding and good natured give it plenty to eat and something to do.

While this speculation does seem correct, the average farmer was not an unthinking character by any means and was far from being satisfied with his condition. Although he was not blatant in publishing his disadvantages he had aspirations which are liable at any time to take form and give an impetus to action in healthy minds. Hitherto he had not secured nor could he secure these comforts and luxuries obtained by people engaged in pursuits absolutely depending on him for their very existence. He appeared to be a long eared animal yoked to the mill wheel, while gloved hands with arrogant pomposity carried off his grist. Citizens in rural burghs who did not represent perhaps one-half of his substance nor any superiority of intelligence were clothed in fine garments faring sumptuously every day. They had opportunities for recreation and amusement which he could not obtain. They had many conveniences unattainable so far, at least on his farm. They appeared ordinary people in point of business capacity, not apparently superior to himself. Comparisons of urban homes, streets, gay and beautiful goods exposed to purchasers, he always made to his own disadvantage. Those splendid fabrics in shop windows were for citizens not farmers. Much

as he admired them they were beyond his ability to procure. The social position indicated by these residences was beyond his reach. A refinement equal to what he supposed was to be found in these dainty homes could not be found in those humble unattractive dwellings on some concession line. His visits to market usually increased his dissatisfaction with his own condition. He knew all his difficulties and disappointments from bad crops, wet or dry seasons, and low prices. Like many cynical souls he naturally thought he alone bore all this earth's burdens. Men were building railways, telegraph lines, organizing great financial concerns. Money it was said was becoming cheaper and plentiful. Interest was falling. All these encouraging indications of progress were of great moment to the nation. But amid all this prosperity, the midge still ruined his wheat fields, eating out the means of existence for his home and family. At this period of which I am writing and which comes within my own experience as an Ontario farmer, legislative enactments were passed proctecting medicine, law, manufacturers and general trade of all kinds but nothing for the farmer. He had no college where experiments were conducted in his interest which he could not undertake himself. There was no Farmers' Institute to disseminate information regarding new methods or discussing their application to sections of our country. Every farmer fought his own battle independent of his neighbor or any person else. He stood single handed against agricultural difficulties. The man behind the plow appeared to have no friends, he was left alone.

It is not surprising therefore that he became in some degree cynical in his manner of thought. Every other calling in life was apparently preferable to his. He did not disguise his sentiments and feelings from his family. At this point, therefore, I affirm is where dissatisfaction with agricultural life begins. Right here is where the farmer's boy receives his first lesson as to preferring almost any other business to that of farming. Right here his young inexperienced mind receives a bias which no after conditions nor circumstances can ever altogether overcome. There is no question but the exodus of farm boys from agricultural life arises largely from early education in their own homes.

There is no question but that young people reared in a farm have in far too many instances listened to their condition contrasted with that of city life, greatly to the disparagement of the former. Such an education is easily comprehended by young minds. There is a glamor and a glare in city life that attract inexperienced people. They are carried away by appearances. They have no knowledge of the world and accept as gold all that glitters. They have youthful hopes, aspirations, likes and dislikes. When as boys they visited the town they were clad in homespun and coarse boots. They looked rustic indeed. They felt that to compare their raiment with those dainty garments they saw worn by townspeople would surely be greatly to their own disadvantage. There was evidence of wealth there, not seen on their concession line. Genteel clerks smiled blandly on them behind counters and thanked them for small coins laid down in exchange for candy, with the air of a French count. Gentlemenly looking business men passed to and from splendid banks. From the street corner the youthful farmer's boy saw visions and dreamed. When we consider that parental influence as far as admonition goes is inimical to farm life and if we consider that natural craving for excitement, which to a greater or lesser degree affects young minds, it is easy to understand why so many boys sever their connection with agricultural pursuits.

Further, I am with reluctance compelled to acknowledge that in too many farmers' homes where several boys are growing up, inferences regarding their individual capabilities are discussed too frequently in their pre-

sence. I need not point out that where invidious distinctions are made to the disparagement of any one in a family grievous wrong has been done. It is still more reprehensible when this is made applicable to farm life. I mean to say a gross mistake is made by suggesting that any one who is considered more commonplace than his brothers, be set apart for a farmer. This implies two propositions: that a youth of ordinary ability is fit only for a farmer, and not competent for professional or commercial life: that it would be a waste of intellectual power to confine for a single day between the handles of a plow any man who can lay claim to the possession of even an ordinary quantity of brains. The dolt of the family or he who is considered so is retained at home to feed cattle and vegetate like a cabbage in the kitchen garden. His brothers are of course sent to school and drilled on equations and grammar, morning, noon and night. They are next sent to High School, then to a University where at the end of five or six years they are turned out into the world as highly finished specimens of professional art. It will be noticed that while this polishing process has been going forward, while they have learned to decline nouns and conjugate verbs they have learned nothing of how to fight the great battle of life. In all their university and high school work not one jot or tittle was ever taught them that it required brains to manage a farm, that in agriculture as it ought to be managed all the education they have received would find full scope for expression.

The trend of an academic course hitherto if not inimical to agricultural pursuits was certainly not favorable to a student adopting farm life as a vocation. It appears paradoxical that with nearly three-fourths of the Canadian people engaged in agriculture, a course of education whose teachings were undoubtedly not in line with Canada's greatest industry should have been so persistently supported. Even now remedial measures for a reconstruction of our educational system are only in an incipient stage of development. It seems to me like a mocking of our boasted knowledge and advanced civilization that it is considered of more advantage to Canadian youth that they should know something about the amours of Cleopatra or the folly of Raamses but nothing of how to feed their own hens. Our present system, as far as giving a young student an idea of the desirability of rural life, seems to be a burlesque on common sense. Schools of learning have taught for ages crabbed Greek and more disjointed Latin to excluding very largely what is practically useful. What is not practical is useless. All knowledge should be broadened and made subservient to the requirements of present conditions. In spite, however of all that is transpiring in this work-a-day world, grave dignified professors in cap and gown still sit in calm seclusion quite content apparently with the old musty methods of centuries long gone by. As far as Canadian education is concerned in connection with agriculture, till recently the dead hand of the dead past has held fast with the grip of a giant the infant struggles of a great living present. It were far better for a boy, rather than torment his brains with dead languages of a dead civilization, that he remained at his own country home and learned to round up a hill of potatoes.

Again there are certain details connected with our present system which have a great influence in drawing boys from farm life. It is through academic training that distinction is obtained. Nearly all life's prizes are arranged so as to fall on academic shoulders. So far there have been too few honors for agriculture. Its history has not been attractive. A great proportion of the men who stand full in the public eye may have been born on a farm, which was only a circumstance. That polish which is obtained in schools is what shines. The stone may not have been of first water but it has been burnished to its utmost limit. It far outshines perhaps a more precious one in

its native clay on the farm. If success is obtained by these boys trained in our schools it is attributed to education. That stalk of carl hemp they took with them from the farm is considered as having no part in their success. The glamor of history as a rule throws her brightest light on educated men. Our schools teach very properly that education is a power of which every youth should avail himself. They have taught also by a discreet silence on this question that greatness cannot be attained by tilling a farm. Young minds are bent and impressed with other ideas than agriculture. There is nothing attractive in its humdrum details, "The lives of great men all remind us, We can make our lives sublime."

Young students are taught, therefore, to look with pride on our great merchants, mechanics, doctors, lawyers, inventors, preachers, painters, poets, baseball players, The mighty achievements of hockey and lacrosse teams, Marathon racers, but so far no farmers. In those national repositories sacred to the memory of our great men, almost every class is represented except the farmer. Does this imply an inherent contempt for honest toil? Let a Normal School student look over that array of figures which seems to throw a halo over its walls. Do they see any farmer there? No, I am ashamed to say for the honor of my country there is not one. Surely all virtue, all self-denial, all earthly greatness, all heroism does not lie on the other side of a degree. Where are all the Millers, Thompsons, Johnstons, Ballantynes, Davidsons, Stones and many others who raised this Canada into the front rank of nations as an agricultural country. All or nearly all are sleeping in their graves. There is no place apparently for a figure of those great men in the sacred places of our people. Again I repeat: Ah yes; they were only farmers. When these details therefore are placed before the youth of this country it is not a matter of surprise that so many leave the farm.

Let us now look at another singularly effective instance attracting the rural population towards city life. In a quiet farm house on some concession line all are enjoying comfort and rest after their duties have been completed. Around the table all are seated—mother with needle and shears making "auld claes look amaist as weel as new." Father is deep in the Toronto papers. The girls are preparing for the school anniversary, while the boys are busy on a book of orations for they have to say a piece on that great occasion. Father announces an item in this week's paper which interests them all. He draws his chair closer to the table and mother moves the lamp nearer him, turning it up a little as she does so. Father cannot boast of much education but he has looked the item over and reads aloud an editorial note as follows. "Honor to whom honor is due. It is a pleasing duty devolving upon us to inform our readers that at a meeting of the Board of Directors of one of our largest financial institutions held in the Board Room yesterday, Mr. B., who has for some time been a trusted employee of the Company, was appointed manager. This Company being perhaps the largest financial institution in this city, the appointment carries with it a remuneration counting away up in the thousands. We are pleased also to intimate that Mr. B. was reared on a farm not a hundred miles from Toronto. Another tribute to the honesty and push of Country boys." This item is read in many farm homes in Ontario.

In homes where indecision was procrastinating it does so no longer regarding boys in the household. Partial parental affection promptly steps into the balance in favor of city life and the beam sways away from the farm. In every family of boys every one is as clever as Mr. B. Their opportunities are quite equal to his. Therefore they must leave the farm and occupy positions in town where remuneration counts up in the thousands.

But again experience and a regard for truth compels me to say to country boys: There was only one position of this kind to fill and there were hundreds who were competent to discharge its important duties. One man out of many, and only one is required; all others fall by the way side. There are a hundred chances to one then that you are of that number who are passed over. We do not hear of these. Failure in any case is not a cherished subject of discussion. Success is written on mountain peaks in letters of gold. Seldom do we know of that long patient struggle endured by deserving professional men in order to gain an honest living. Seldom do we hear of those unfortunates whose names were indeed better forgotten. Let every farm boy consider these and other circumstances that lie alongside of professional life. Let them consider too, in order that one sun should illumine the sky for a day, countless stars must hide their light.

We have now to consider this question of boys leaving the farm in another important aspect.

It is a favorite argument that we farmers should make our homes more attractive in order that our families will remain there. This seems to me like an implied reprimand to farmers generally. It is certainly an unmistakeable hint that our surroundings are no better than they should be. In reply to this, I submit that in new settlements no standard can or ought to be set up. Pioneer life is a strenuous life. It is a continuous conflict with Nature under most adverse circumstances. Any rule as to home environment cannot apply to them. A rude shanty nestling in a corner surrounded by charred logs and blackened stumps does not convey a feeling of comfort. It would be rather difficult to make an attractive home under these conditions inseparable from pioneer life. In old settlements throughout Ontario particularly in Central and Western sections little complaint can be made regarding unattractive homes. I defy contradiction when I say there are no farmers in this world with better houses and barns than are generally found in Ontario. This appears more marvellous when pioneer settlers are still found amongst us who have entered the unbroken forest. Our wondrous success is the highest tribute and strongest proof that agriculture in Ontario is and has been a profitable occupation. Magnificent residences have been or are being erected everywhere. Each is vieing with his neighbor for attractiveness in style and convenience in construction. Flowers are cultivated, trees are planted, music and painting are found in every home where there is a family of young people.

Traders in town will tell you much of their finest goods is going to the country. Canadian farm barns are not only a surprise but a subject of marvel to British and American farmers who visit us on pleasure or business. Fine horses, carriages with silver or brass mounted harness, garments of finest material are provided for the families either for church or market. Still farmers are told to make their homes more attractive and their boys would remain. If there is any foundation for such statements they are fast passing away. As to the isolation of rural life, that cannot be entirely overcome. Telephones are now general in many sections and free mail delivery with improved facilities for transportation will complete in a very short period that march of improvement, begun half a century ago by the pioneers.

Lastly, I desire now to speak of a problem in connection with the life of country boys which I fear will never be entirely solved. A solution would not be difficult as a business proposition. Human nature is slow. During boyhood (prior to 21 years) no injustice is done if a youth assists in farm operations without remuneration being named His father is responsible for the civil conduct of his son and the son is supposed to accept such

kindness and consideration as parental affection measures out to him as complete satisfaction for his work on the farm. So far so good. The age of 21 is passed and the mantle of citizenship drops on the young man's shoulders. He is now legally a man and society demands that he now discharge life's duties and responsibilities like a man. While the age of 21 has passed, parental authority appears not to be cognizant that a change has come over existing relationship between him and his son. Matters for a time drift on as formerly. Fathers and mothers are slow to realize that the child they dandled on their knee is no longer a child but a man. They never can see that a young fellow who is an honor perhaps to themselves is anything else than a youthful prattling boy. They treat him therefore as a child. In continuing to do so is where difficulties begin which often result in separation and breaking up family ties. From this mistaken parental affection a greater number of country boys are driven from farm life than by any other circumstance. The farmer himself is largely to blame for many heart burnings that come into families at this period. His idea is that no one should spend money except in a manner conforming to his desire or authority. All shall labor and place their earnings in his hand as custodian. When he dies which may not be long they will get all he has. This does not seem unfair and is surely a pleasant way of doing things, for a man of 50 or 60 years who has reached the superbly economical period of life. But what does his family think of this? They certainly have rights. Under this plan a young man has no means of obtaining an income for personal expenses except through his father's hand. In far to many instances contributions from this source, (it may be to an industrious careful youth) would be of such magnitude as those he contributes for missionary effort in the Fiji Islands. There is this distinction, however, that while the son may thankfully receive small mercies, the islanders if remittances fall very far short may prepare a feast of tabernacles, the principal viand of which would be roast missionary. It must be noted also that young men do not reason along such lines as men of three score, nor as they themselves will reason at that period. They have aspirations peculiar to themselves which must be ministered to. If it can not be on the old homestead it will be somewhere else. A young farmer must and will have pleasures and enjoyments for which youth craves. He must move in that society becoming to a son of an independent farmer. At Fair time, excursions, country hops, school anniversaries, circuses and shows, he has a right and should be present. Everyone of these are educators for a young man. I can conceive of no more humiliating position for a spirited youth of 25 years than waiting patiently for the wretched pittance from a father's hand. And this must be obtained before he can enter that circle of which he may be an honored member or hold up his head like a man. It destroys manhood and independence in a youth to supplicate even his own father for what in simple justice is rightly his own. While this order of things is true many farmers are not niggardly with their family and give money lavishly for their comfort or their pleasure. It is clear therefore that other means ought to be adopted with farmers' families than that plan where all labor it may be for years for food and raiment only.

Every farmer when his son reaches the age of 21 years ought in justice to both parties to arrive at a proper understanding as to their relationship in regard to compensation for services performed. The stereotyped plan put forward where no arrangements are made is that some young animal (a colt for instance) is given him as his own property. This animal he is to feed at his father's expense from produce raised on the latter's farm. When a proper opportunity arises he sells this animal. The proceeds of such sale

are considered ample compensation for his son's services for a longer or shorter period. A more wretched evasion of discharging what is undoubtedly an honest obligation in a straightforward manner one could hardly conceive. It is often put forward, however, as a solution of that perplexing question of retaining boys on the farm. It will do nothing of the kind. Such a plan as this would certainly tend to create selfishness in any youth if he had any predilections in that direction. Whatever became of his father's stock his one would receive an ample share. It would be only human nature that such should be so. I have seen a farmer point to a particular animal as belonging to one of his sons which he had given to him in compensation for labor. It needed no great observation in a stranger to determine that some influence was operating very evidently on this animal. This influence was very apparent too as being detrimental to others along side of this same class.

As a matter of fact that farmer was injuring himself and injuring his son. The youth was becoming selfish at his father's expense. He was fast learning dishonesty through his father's parsimonious stupidity. I may be permitted to say here that a young man who can be retained on a farm by the value of a colt or a calf will never write his name very high as an agriculturist in any land. Greater and farther reaching inducements than these must be placed before him. An appeal must be made to far higher qualities of mind and heart in order to retain youth on the farm.

It is pointed out, however, that only small sums of money pass through a farmer's hand. It is much more difficult for him to discharge his obligations with bankable funds than men in other lines of business. This may be true but all that does pass through his hand is his own. Money passing through a trader's hand is not his own. He turns it over paying for his goods. He may or may not have been able to retain a percentage for his trouble. This is due an honest trader as much as it is due an honest farmer. There is this important difference, however. A trader must send his money to pay the manufacturer for his goods. The farmer is trader and manufacturer combined in one. His goods result from his own labor and are all paid by fair honest work before they are available for market. We admit then when improvements and ordinary expenses of management are discharged farm profits are large. They are always certain, however, and would be much larger if fair reasoning was applied to expenditure. For instance, money expended in permanent improvements should not be charged to ordinary expense. All money expended in permanent improvements is placed in a bank that will not fail, by increasing value of property. This again returns compound interest by giving increased profits in crops or otherwise helping in further improvements and accumulating agricultural wealth. Many farmers are poor by continuously improving or increasing their possessions procuring more land. Too many again attribute their shortness in bank account to the poverty of their calling, when their difficulties arise (from a spirit to some extent laudable) in trying to outstrip some neighbor in the quality of his buildings or number of his acres. A matter of $30 or $40 per annum would not be an unreasonable sum for a young man's disbursements on a farm. This is particularly so when no account is taken of lost time and he has full use of his father's horses and carriages free of all cost. An understanding beyond this could easily be reached whereby further sums to which a son would be entitled need not be drawn out of the business but remain to his credit as an investment. I may say, however, that a practical solution of this question is difficult. So many diverse circumstances interfere that no rule could be laid which would apply to all. This much is clear, however, that no young man should be asked to remain at home on a farm without a

proper understanding regarding his prospects. A disregarding of this principal causes a greater exodus from farm life than any other cause of which I am aware.

Before closing this chapter on "Why boys leave the Farm," I may be permitted briefly to point out one or two considerations relative to professional and agricultural life. Two important factors appertain and present themselves affecting each. Professional life is surrounded with circumstances that as a rule are difficult to overcome and in some instances, I regret to say, are never overcome. Those connected with rural farm life are with ordinary foresight and industry always overcome.

As to the first of these we will suppose a farmer's son has finished his university course with honors in law or medicine. The old farm has fitted him with the appliances necessary for an entrance in the race for success in his chosen profession, say medicine. A suitable location has been selected. An office equipped with all modern requirements is procured. An advertisement in the local press with an imposing array of letters to his name is inserted. A shining brass plate adorns his office door. His name is engraved here with faultless accuracy. On his office window in conspicuous gold characters is announced to seekers after health that Dr. B. hath an office here and will wait on patients during office hours. He is fully equipped for a start. All is now ready for success but patients. There is his degree, his diploma, his license from the Medical Association, his Post Graduate course in Europe, but where are the patients? The brass plate on his office door, the gold letters on the window are duly kept bright and imposing, still there are no patients. He teaches in Sabbath School. He is an exemplary moralist. He is a member of the church, friendly with the minister and a favorite with all aspiring young ladies of the town. He is active and prominent in several societies but where are his patients? Without some one desiring his advice or co-operation in alleviating some affliction to which life is heir, what does all this amount to? So he waits, and waits, and waits. Every foot fall at his door-step awakes a feeling that at last his time has come. It passes on as thousands have passed before and dies away in the distance. So time flies on. The dream of his college days passes away. There are other and older practitioners than he, who have by long and earnest work attained the people's confidence. He must wait with patience until the cloak of another man is spread on his shoulders by a cold hand. So time passes away and before success comes, which it may or may not do, its sweetness is gone. The bitterness of waiting so long has impaired his powers of enjoyment. Has not life lost its seasoning and hope diffused made his heart sick? The same argument and the same circumstances apply to any profession or commercial life, that depends on public favor for success. We have all seen professional and commercial men who have passed all or a goodly portion of their lives waiting for a turn of fortune's tide that never came. Such ones are to be pitied but there is no help. They are like living souls enclosed in sepulchres from whose door no hand ever comes to roll away the stone.

Let us now look at the case of a country boy who has remained on his farm. While success is problematical to professional or commercial life, to him it is assured. Assuming that two young men are equal in intellectual and physical capacity, with one as in the case illustrated, a deserving professional life may result in failure; on a farm equal opportunity would be successful. The farmer's boy did not wait for customers to purchase his goods. Neither did he wait for clients or patients requiring aid from his professional skill. He was independent of all these. He was master of

all conditions surrounding his business. Assuming that he understands agriculture as well as most farmers' sons, if he prepares his soil well in spring, there need be little doubt as to results in harvest. He does not sit day after day lonesome and apparently forsaken waiting on a welcome call for professional aid. He has full scope for his strength, his energy, and thought, from that hour he assumes the responsibility of farm management. He waits for no man's shoes. He solicits no man's patronage. He asks no man's favors which might perhaps be extended by ill-disguised condescension. His own acres will repay his labor independent of any surrounding conditions. With these advantages then I desire to impress on all farmers' sons this great truth. Give close and honest attention to your farm operations and there is no fear that a modest independence will be attained before nine-tenths of professional men can do more than earn a respectable living.

And again, during this period you have been so busy in laying firm foundations for your fortune, you have not been compelled to stand second or cater to the whim of any living man. You have had the best of food for your table in abundance. You have had health, strength and a moderate degree of prosperity in your business. Above all you have had the glorious privilege of being independent.

Lastly, there is danger of farm life leading to isolation which must strictly be guarded against. Isolation is usually the parent of cynical thought, a state of mind disastrous to happiness and to some extent to future prospects. Keep a close watchfulness on other lines of business besides your own. You are interested in many directions with this world's affairs. Under no consideration engage in anything which will have a tendency to withdraw attention from your farm. Keep pace with modern thought and discovery in your own affairs particularly. Leave experimental work to the College at Guelph. Evolution in agriculture is so constant and aggressive that your continuous attention is necessary in order to appropriate new methods. By your own observation, the aid of the Farmers' Institutes and those bulletins sent out from the Ontario Department of Agriculture, and from Guelph, you will be able to keep fully abreast of modern thought and modern improvement. Visit the College every year at least once for there is much to be learned there of which you can not avail yourself anywhere else. Patronize the agricultural papers of Ontario and analyze opinions expressed in their pages from time to time by prominent farmers. Try every innovation or method put forward by your own judgment and experience.

Accept no statement from any man till you have submitted it to investigation under the crucial test of your own common sense. In short, be public spirited, charitable to all men, honest with your farm, kind and affectionate to your animals, then with ordinary thrift and industry whatever changes may come or go your success is assured.

IMPROVED ROADS IN ONTARIO.

By A. W. Campbell, Deputy Minister of Public Works.

The Good Roads problem in Ontario is a question of various aspects and details. There is the economic side of the question which furnishes largely the motive for good roads; there is the system of management which is essential to cheap, but permanent construction; and finally there is the matter of practical construction involving much detail as well as a broader understanding of the general principles of the art.

Road construction in Ontario along improved lines, is but in its infancy. While much has been done in the past, there remains much more to be accomplished. From all classes of citizens there is a growing demand for good roads. It is impossible to sum up in a few words the reason for requiring better roads. The benefits are very many. If described in detail they are apt to lose weight, but the aggregate furnishes a motive of very great importance. It is to some extent, summed up in the statement that no civilized country ever reached its highest state of development without a good system of common roads. It is seen in Ontario, wherever good roads are constructed, by the fact that property along these roads at once increases in value to a remarkable extent. The people of the rural districts want good roads in order that their social condition may be improved, and that farm life will lose much of its inconvenience and isolation. The people of the town want good roads in order that they may reap the benefit of a richer and more highly developed country surrounding them. The construction of good roads throughout Ontario is a great public work in which all citizens are deeply interested.

In order that the work of road construction may be carried on systematically and at a reasonable cost, it is essential that there be an efficient plan of management. The great defect of statute labor, with its large number of path masters rotating in office from year to year, is that it is utterly without system. There is no responsible head to direct the work, no one who can be held accountable for mismanagement. Even the council itself, with the little responsibility assumed by that body, is changing from year to year so that no definite scheme of work can be carried out. It is impossible to improve and construct all the roads of a municipality in one year; it is a work extending over many years and as such requires a plan which will reach into the future. This can only be accomplished by having a permanent head over such work—a road superintendent whose tenure of office will be similar to that of a municipal clerk or treasurer. Such a man is not an added burden to the township; but he takes the place of an army of path masters and does away largely with the commission fees annually paid to councillors. Road construction is a matter requiring experience. A permanent superintendent over this work is every year adding to his efficiency and making his services more valuable to the township.

To enable a municipal road superintendent to carry on the work in the most satisfactory manner, it is desirable that statute labor be dispensed with, and that all the energy available be placed on a cash basis. By this means the road superintendent can demand from all employed by him, a reasonable day's work. He can, without question, fix the size of loads to be hauled, and the number of loads to constitute a day's work. He can perform the work where it is most required, taking up the worst pieces first, or the most heavily travelled sections, bringing them to a permanent condition, and steadily extending the work from year to year. The cost of road construction is largely dependent on the cost of labor and the amount of work performed, and it is not an uncommon thing to see an efficient road superintendent take hold of a road system and by careful management reduce the cost by one-half.

It may be asked, "Have any municipalities undertaken such a system of road management, and have they proven uniformily successful?" A large number of townships throughout the Province have placed their work under road superintendents. The great majority have continued the improved method; but some few have reverted again to the old statute labor methods. The reasons for the latter have not been far to seek, and have commonly resulted from failure to secure a thoroughly competent and tactful road super-

intendent. In this, as in most other human endeavors, success depends upon the man. The superintendence of municipal road work requires thoroughly practical ability, and force of character. It requires tact and an understanding of the principles of road construction. Where a municipal council with all honesty of purpose undertakes to reorganize their system of road construction along better lines, there can be no doubt whatever of ultimate success. The first year's experience will probably produce certain dissatisfaction, but as time passes on the citizens would no more revert to statute labor than they would to farming methods of a century ago.

The greater majority of roads throughout the Province must continue to be maintained under township management. There is, however, a need for the efficient and early construction of the more heavily travelled market roads, or roads which if properly constructed would be heavily travelled. A commencement along the line of permanent construction should be directed to such roads, and in order that this may be undertaken without delay, systems of county roads are being established throughout the Province, to which the Provincial Government contributes one-third of the cost. These are now fifteen in number. These roads, as previously pointed out, do not follow the lines of old county systems leading continuously through the county, but are the main highways leading to towns, villages and to the stations. They are what may be called the market roads, upon which traffic from roads adjacent to them may be collected. They should be so located that no farmer may be more than two or three miles from a good road leading to his market town. These roads, as with the township roads, should be placed under a competent superintendent, responsible to the council, and carrying out the directions of the council in so far as they are required.

The practical work of road construction is not a matter of one simple formula. Engineers throughout the world have long sought for such a system of road building. In the proper application of science to the service required and the means available, there remains a great scope for skill and experience. No two localities are precisely similar, either in requirements or material available; while conditions of soil and climate also require much consideration. In the application of general principles to local requirements and conditions, must be found the only economical solution.

In a general way, all work of road construction may be referred to drainage. Good drainage is the first requirement of good roads. The reason roads are good in summer is that they are dry. The drainage of a road requires that the surface be given a crown or camber that will shed water to the side drains. Side drains must have a good fall to their outlets, and a sufficient capacity to carry the amount of water flowing into them in times of freshet. Tile drains should be used to take the sub-soil water out of the roads; to tap springs, and to make a dry foundation upon which to place stone or gravel.

Every experienced road maker knows that a newly constructed road should have a high crown, otherwise it will soon become too flat to shed water. This is a detail upon which the public require to be informed, as, wherever good roads are being built, road overseers are frequently being impeded in their work by complaints from the public that the roads are being built "too high." A road will not get higher as the result of wear. On the contrary, many forces of nature are at work to lower and flatten it. The crown given the finished roadway should ordinarily have a rise of from 1 to 2 inches to the foot from the outer edge to the centre of the road, giving the metal portion of the crown of 1 in 12, and the earth sides 2 in 12. Roads on hills should be sharply crowned, otherwise water will follow the wheel tracks and deepen them to ruts. Roads should be sharply crowned at the top of a

hill, a detail often overlooked. They should also be sharply crowned at the foot of a hill—as indicated by the puddle so often lying there.

Open drains on the side of the road should have a continuous fall, and should have outlets into all natural water courses crossing the road. To gather water in a long drain causes expensive washouts in time of freshet. Where drains are deep at the side of the road, merely to carry a small flow through a rise of ground, the safety of the road can be improved by using a large size of tile to carry this surface water.

Tile drainage is of as much benefit to roads as it is to farm lands. Wherever tiles have been generally employed on roads, their great value is understood. They keep an excess of water from accumulating in the road during the fall and winter, while in the spring they rapidly remove the subsoil water to the depth at which tile have been placed. Roads that are tile-drained, dry up very quickly in the spring, and they are not so subject to "breaking up." Tile drains are of special value on hills where springs issue. On hills it is often desirable to carry a tile drain down the centre or along the shoulders of the road, tapping springs or spongy places, by diagonal drains entering the heart of the spring. Where there is a moderate grade of upwards of three per cent., a drain should be used on two sides underneath the shoulders. In a flatter country where the filling over the drain is not likely to be washed out, tile drains may be laid underneath the open drains and greater depth thereby secured. In stiff clay two tile trains should be used, and these should be covered with a porous material, such as gravel or cinders. In gravel or other porous soil, one drain underneath the side of the road will do nearly all that two drains can do. In quicksand, or running clay, the tile should be covered with sawdust, sod or cinders, to prevent the tile from being clogged. The ouflets of tile drains should be set in walls of concrete, extending below the severe frost line. This will prevent the tile at the outlet from being obstructed or broken.

The roadway graded for traffic should be straight in the centre of the road allowance, and should have a uniform width between the inside edges of the open ditches. The width of roadway on cuts and fills should not be less than 18 feet. Main roads should be graded to a width of 24 feet, but for low roads of little travel, a width of 18 feet is often sufficient. Every extra foot of width adds considerably to the cost of maintenance, in that the earth sides of a road are easily flattened and rutted, and so obstruct the surface drainage. From this cause, the soil under the road metal is softened by soakage, and the entire roadway is more easily cut and rutted. While a wide roadway is desirable in many respects, and while the cost of construction may not be considered excessive, the cost of maintenance is considerably greater in proportion. Narrow and well crowned roads are most easily and cheaply maintained.

Stone and gravel are the two most commonly employed surface materials in Ontario. Stone is more durable than is gravel. Under ordinary circumstances, one cubic yard of crushed stone may be said to equal two or three yards of gravel. Much gravel of a very sandy or earthy character, is scarcely worth the cost of hauling. It is the stony metal which is required to resist wear and support traffic. It is desirable that the stone or gravel should be of not less width than 7 feet, nor of a less depth in the centre than 6 inches. The width of metal should be in proportion to the width of grade, and so applied that there will be no temptation to use an earth roadway alongside the metal track. An earth roadway alongside, and on the same grade as a gravel or stone surface, means the early destruction of the latter. In some districts crushed stone is the only material available; in others there is some choice between gravel and crushed stone. Where this is the case, it is desir-

able to use crushed stone close to the towns, where traffic is heaviest. It will frequently pay to import crushed stone by rail for use near towns, (while local gravel may be used on the outlying roads), using the stone as far as the cost of teaming will permit.

Gravel, if used, should be clean, and every precaution taken when excavating from a pit to see that only the best quality is selected. If the gravel contains much coarse stone, the entire material may be run through a crusher. When this is done, a rotary screen should be used, and the material elevated into a bin. When applying the material to the road, the coarsest grade should be put in the bottom of the road. The finer material, such as will pass through a one-inch screen, should be spread over it and on the top coat sprinkle a light coating of the screenings. As a rule, a large part of the sand and earthy screenings, should be wasted, as they are not worth the cost of hauling to the road. It is found in the County of Woodstock that owing to the more rapid means of filling wagons from a bin, gravel can be put through a crusher at little, if any, extra cost.

Before putting stone or gravel on a road, it is absolutely essential that they be graded and crowned, otherwise the drainage must be defective. In this, see that the graded portion is straight and in the centre of the road allowance, and that the road allowance is in its permanent location. All hills should be graded and fills completed before gravel or stone is put on them. Roads should be so located as to avoid steep hills and swampy or other unfavorable land, with a view not so much to first construction, as to future service and the cost of maintenance.

In the construction of roads, modern machinery and implements should be used, so far as possible, to secure the greatest results from the expenditure and to provide the most durable work. A complete outfit of roadmaking machinery, should include for nearly every municipality, two or more graders, a stone crusher, a traction engine, steam or horse rollers, spreading wagons, wheel scrapers, a water wagon, and other more common tools. Sufficient graders should be used that all the grading required for the season can be done early in the year, before the crown becomes packed and hard.

The use of a road roller is strongly recommended. It effects a great saving in the amount of material required on the road; it produces a road which is at once in its best condition for traffic, and which has a maximum of durability. When the people of a district have used roads produced by means of a roller, they will not accept an inferior type of road. Not only should the road metal itself be consolidated with the roller, but the earth sub-grade should be rolled before the metal is applied. A road can scarcely be rolled too much. The steam roller, wherever its work is known, is considered the most efficient of modern roadmaking implements.

While the ultimate aim of a good road system throughout Ontario should be one of macadam or gravel highways, yet the great majority of roads must for some years remain almost in the natural state. Much good can be effected in the improvement of these roads by the use of the split log drag, for maintenance. Even without the grading machine the split log drag alone will, if persistently used, do all that the grading machine can do, but at a greater expenditure of labor. For earth and clay roads, municipal councils should everywhere establish the systematic use of the split log drag and by this means the usefulness of the common earth or clay roads can be greatly increased.

The loads passing over the roads of Ontario are constantly increasing in weight, and for this reason stronger bridges are required. Steel and concrete afford permanent types of construction, which will be of permanent

benefit. The time has gone past in Ontario when only present requirements can be considered. We owe an immense debt to those who have cleared the forests and brought this country to its present stage of productiveness. Permanent types of roadway, throughout older Ontario, are giving the greatest satisfaction wherever they are built. When once experienced, citizens are willing to pay a reasonable cost, but the past history of misapplied expenditure on roads, has naturally created distrust of improved methods. Wherever good roads have been introduced, the people are in every way generous in their support.

DESCRIPTION OF A GOOD DAIRY FARM.

Prospect Farm, Owned by R. & A. H. Baird, Chesterfield.

We have the pleasure in giving below particulars regarding the above farm. It has been thought well to present the facts in the form in which they have been given to us by the proprietors. We believe in farmers talking to farmers in their own way.

We are certain that if the principles, outlined in the descriptions given, are followed by the dairymen of the Province, we shall see a great improvement in the coming years. The records of sales and the comparatively small amount expended for feed, should be an encouragement to the dairymen of Ontario to follow up-to-date methods and take steps at once to improve their herds along some definite line. The statements by Messrs. Baird follow:—

"In describing our method of farming, we think it might be interesting and helpful to others who are contemplating going into more special system of farming than they have been practising, to give a little of our past history. We shall go back eighteen years when we began to make a special study of dairy farming, and more especially the home production of high class butter, and fat hogs. Previous to that time we were engaged in mixed farming, that is, we kept about fifteen cows, mostly good grade shorthorns; these were bred to pure bred shorthorn bulls and their calves were fed well and fattened for the export trade. We also kept a number of sheep, some hogs, and raised a few colts. Our milk was sent to the cheese factory in summer time, and as we had some of our cows drop their calves in the fall, or early winter, so as to raise better calves, the milk from these cows was churned at home and the butter was shipped to Toronto, making weekly shipments. Although we did not have a very large quantity, we got a good price for it and it encouraged us to pay more attention to butter making. Eighteen years ago a grocer from Hamilton heard we were making butter and came to see us. He offered us such a tempting price that we made a contract with him for a year, to supply him with all the butter we made, except what was used for home consumption, and we may say here that in the past eighteen years we have never missed a week in making a shipment of butter to the same firm.

As we have already stated, our cows then were grade shorthorns, most of them giving a very fair quantity of milk; and as the Babcock test was then unknown, we used to make churn tests of our cows to find out if they were profitable. This was a very laborious way, but it convinced us that we had a number of cows that were not very profitable, and we began to put more thought into the business and decided to buy a registered Jersey bull and cross on our grade cows. The heifer calves from this cross, made splendid cows and we were so pleased with them that we have continued using Jersey bulls over since. In 1891 the Babcock tester was put on the market. We bought

one and began to make a more thorough test of our cows, weighing the milk of each cow one day every week, and testing for butter fat. We have looked up some of our old records, and find our first Jersey-cross heifers, 24 months old, came into milk in the year 1892. The three best gave, on an average, 4,820 lbs. of milk, 265 lbs, of butter; the three best short horn grade mature cows, the same year, averaged 6,480 lbs. and 295 lbs butter, the average for the entire herd, 20 cows, was 236 lbs. butter. We also made it a point when it was necessary for us to buy a new bull to go and thoroughly inspect as many of his family as we could find, giving special attention to secure one from a family of rich persistent milkers, with good udders and teats. We never allowed the price to induce us to take a bull that we did not like, believing as we did that the best is cheapest in the end, and that the bull is more than half the herd. By careful selection of the bulls and the use of the scales and tester, our herd last year made an average of 330 lbs. of butter, and we hope to continue to increase the average production of butter per cow, by giving closer attention to the breeding, weeding and feeding. All cows that do not return a profit, have their feed increased until they are fat enough for the butcher, when they are sold. We continue to milk these cows up to a month beforo they are sold, as their milk will about pay for their feed.

As we increased the number of our cows, we also increased the number of our pigs, keeping eight to ten sows and breeding these to a pure bred Yorkshire boar. The pigs are fed skim milk, mangels, middlings and chopped oats, they usually weigh about 200 lbs. each when six or seven months old, and taking one year with another, we have found the feeding of hogs paid us very well. We give below our sales of hogs for a few years. In the year 1895 we sold 82 hogs, average weight 185 lbs., total weight 15,230 lbs., average price $3.66 per cwt. $568.00. We give this year to show what we may strike sometime, but in that year we bought bran for $8.00, middling $9.00 per ton, and oats for 18 cents per bushel.

	Average price.	Weight.	Total weight.	Gross value.
1905 we sold 132 hogs	$6 10	193½ lbs.	25,540 lbs.	$1,560 60
1906 we sold 122 hogs	6 60	194 lbs.	23,770 lbs.	1,568 00
1907 we sold 127 hogs	6 40	196½ lbs.	24,953 lbs.	1,577 50

We sell hogs nearly every month in the year, so these prices are a good average for the year. These statements do not include fat sows or stags sold. Our pigs are fed twice a day, mixing their grain feed with skin milk and fed in such quantities as they will eat up clean at the time.

Housing of Stock.

Our barns are the usual basement barns built a number of years ago on good solid stone walls. As little attention was then paid to dairying, the stables were not conveniently arranged and were far too dark, the windows being too small. In 1900 we rebuilt our barn and stables, putting in large windows on all sides, making it nearly as light inside as it is outside, cement floors, single stalls, and water buckets in each stall. The cows lift the cover and drink whenever they want to. The stables are cleaned out with a wheelbarrow lined with galvanized iron, so that the walk behind the cows is always dry and clean. We would not use a boat or any other way that we have seen in preference to the wheel-barrow. The walks behind the cows are kept so clean that any one can walk around the stable with the finest

shoes and not get them soiled. When Prof. King advocated the King system of ventilation, we installed it in our stables and it has been a source of satisfaction to us ever since, fresh air is admitted into the stable through three or four inch tiles, these tiles are built in the wall about 2 feet from the top, run half way through and then straight up, opening on top of the wall in the stable, in this way no draught can strike on the cows. The foul air is taken out of the stable "from the floor" through 2 feet square shutes that run up higher than the barn. These shutes are built of two thickness of one inch lumber with tar paper between, and are always dry, and keep the stable dry, and the air pure in the coldest weather. In 1891 we built our first silo, 18 feet square, 21 feet high, of 4 thickness of hemlock lumber, with tar paper between. This silo has been filled every year since and is in good condition yet. We were so well pleased with ensilage that we built others—two stave silos—and have just finished a cement one 16 feet inside diameter and 40 high. This silo cost $300.00. We now have silo capacity for about 500 tons. These silos are arranged around the barn in such a way that a door opens from the stable into the shute between the stable and silo, and the ensilage can be quickly and easily loaded in a large barrow and wheeled in front of the cows. No expensive stables are needed to produce sanitary milk. If the owner only makes up his mind, he can put in larger windows if his stable is dark, sweep down dust and cobwebs, give the interior a coat of whitewash and make other improvements as he can afford them. It pays, however, to put in a cement floor and ventilating system, the floor to save all the liquid manure, and we should not compel any animal to breathe impure air when pure air is so cheap.

Feeds raised on the farm are corn, mangels, oats, a few acres of fall wheat, and hay and pasture. Thirty acres of corn is grown, a large dent variety that will produce good ears and mature pretty well. This is all cut and stowed in the silos. Six acres of mangels are grown for hogs and young cattle. We think there is nothing so good for calves and yearling heifers as a liberal supply of mangels. About forty-five acres of grain are grown each year, nearly all on land that has had a crop of corn, mangels or potatoes the previous year. We can always grow splendid crops of oats after corn. Twenty acres are pastured, and about fifteen acres cut for hay. We can grow enough rough feed for all our cattle, about seventy head, and six work horses, but have to buy some straw for bedding for pigs.

In addition to the feed we grow on the farm, we buy about fifty tons of bran and middlings every year. This feed costs us about $1,000.00 a year. We have good market conditions for buying these feeds, as several local mills in operation near us, turn out a good quality of feed. A few tons of oil cake meal is also fed, and as we are only eight miles from the great oil mills at Baden, we can get this feed whenever we want it. Our cows are fed twice a day only. Ensilage is fed morning and evening, all they will eat up clean. A grain feed consisting of bran, middlings and cropped oats is put on top of the ensilage in their mangers. We get the best results from feeding equal parts of these three feeds, and not more than two pounds of oil cake to each cow per day, from four to eight pounds of grain is fed every day in the year, except when the grass is good. When only about two pounds is fed, a small feed of straw is given in the morning and some clover hay in the evening after milking. Fed in this way our cows always look well, and the results are as we have stated before, 330 pounds of butter per cow last year. A number of our mature cows make between four and five hundred pounds of butter per year; one cow for the last three years has gone over five hundred pounds so we feel encouraged to continue in our work. However, we

have made a start in the growing of Alfalfa, and have secured a good stand; and if it withstands the winter as well as we expect, we shall seed more acres next spring. Our aim will be to grow seventy-five tons a year, and if possible cut down our bill for milk feed.

As we have already stated about one-third of our farm is under corn, mangels and potatoes every year; all this land is manured, putting on nine to twelve loads per acre. We prefer using about nine loads, as we get just as good crops, and can get over the entire farm in three years. Twenty acres of sod is plowed each year and sown to corn, this is either manured in the fall and plowed under, or if we do not have enough manure, it is done during the winter and plowed in spring. Our land is all thoroughly cultivated and with the large number of cattle and hogs kept, feed bought and fed on the farm, and nothing sold but butter, hogs and fat cows, it is bound to become richer and more productive. Of course, weeds will start to grow, but the continued use of the two-rowed corn cultivator will subdue them and bring along the corn at the same time.

Milking and Buttermaking.

Good feed, clean stables, clean cows, and clean men are all very important factors in producing milk of uniform high quality. Our stables are kept clean every day, whitewashed at least twice a year, and it is a common expression of visitors, "One could live in your stables." No manure is allowed to accumulate on the cows' thighs or tails; they are groomed more or less every day. We have often seen the statement in the farm papers that it is a good plan to run horse clippers over the thighs and tails as an aid to cleanliness. We think this is a great mistake, as it must cause the cows great discomfort and certainly disfigures them. A far better plan is to have a deep gutter behind the cows, put two inches of straw in the bottom every day after the stables are cleaned, this will keep their tails clean, and use the comb and brush on any part that is soiled. In the care of milk, cleanliness and temperature are the two most important factors. Use brushes instead of cloths when washing up and have plenty of scalding water at hand. Thus, one can keep things clean. By storing a large quantity of ice, we have no trouble in controlling the temperature. We believe it would pay every dairyman, no matter how he was disposing of his milk, to store enough ice to keep his milk in the best condition. One great trouble around many of our houses, dairies, cheese and butter factories is the lack of a proper sewage system. This was always a cause of annoyance to us until three years ago we put in two septic tanks and filter beds, one at the house and one at the dairy. These tanks and filter beds cost from $40.00 to $50.00 each and are a source of satisfaction at all times. We should like to see many more installed by our farmers. Any up-to-date hardware man can tell you where to secure the necessary equipment and how to put it in.

Our dairy building is 16 x 22 feet, with an engine room 10 x 16 feet, and wood and coal shed 13 x 20 feet attached. A 6 h.p. engine and 6 h.p. boiler furnishes us with all the power and steam we want for heating water, running separator, churn, and pumping water into every building on the farm. Our well is an artesian one, 210 feet deep, and we have an abundance of pure water. We also heat our dairy building with the boiler. It costs us for wood and coal about $100.00 a year, but is such a saving of labor that we would not be without it, and at any dairy where a large quantity of butter is made. We think no power can compare with steam. Our steam power plant (complete) cost us $425.00.

We keep two men the year round; so our farming operations represent the work of four men. By carefully planning our work and pushing things along, we always manage to keep our work pretty well up, and have enjoyed doing it as well. In the years we have been in dairying we have had our times of disappointment and troubles the same as falls to the most of mankind. We used to lose many of our best cows with milk fever. Now this trouble has no terror for us; and many other troubles we have met and overcome. We expect we shall have to meet other troubles in the future, but we will stick to it, and remember the old Scotchman's advice to his son to 'aye haud furrit.'

We have made money and if our ideal of farming consisted in saving and hoarding every cent to put in the bank, or invest in other risks we know nothing about, we could do so, but this is not successful farming as we see it. We believe in re-investing our profits in our own farm in better buildings and equipment and we know we can secure higher interest in this way.

We thoroughly believe in a man making a careful study of his business, and no matter what branch of farming he adopts to keep at it, and not change unless he is sure he will do better, and intends to stick to it."

DAIRYING—RETROSPECTIVE, PROSPECTIVE.

By H. H. Dean, Prof. Dairy Husbandry, O. A. College, Guelph.

It is currently believed that when a person grows reminiscent, 'tis a certain indication that he or she is growing old. Whether or not this be true, we are not in a position to say, but when the Superintendant of Farmers' Institutes asked me to write an article for the forthcoming Report, I thought of many of my experiences during the past eighteen years as lecturer at Farmers' Institutes in various parts of Ontario. To satisfy myself that I am not old (for whoever knew when he became old?) I also, like a youth, thought of the future; so then what I have to say will centre about these two phases of the Dairy Industry.

Looking Backward.

As I look back over my experiences with men as lecturers or co-workers at Farmers' Institute Meetings, four names seem to impress themselves upon my memory—Charles Drury, John McMillan, P. C. Dempsey and W. S. Fraser. All of these, except the genial Fraser, have done their work and have passed into the great beyond. I well remember the clear logic and calm eloquence of Mr. Drury; the vociferous, sledge-hammer addresses of John McMillan; the dry humor of P. C. Dempsey, who used to tell of the lawn mower seen on many farms which cut the grass, carted away the material cut, and at the same time distributed fertilizing material for a future crop. Smiling, fun-loving Fraser—how he used to delight in getting me into an awkward situation, but I was asked to write of Ontario's dairying, and must to my task.

Some Changes.

The dairy farmer and his methods have changed very little, so far as I can see, during the past eighteen years. There has been a slight improvement, but not a great deal. During a visit paid in the season of 1908 to one of the oldest and best cheese dairying sections of Western Ontario, I was sur-

prised to see that the major portion of the milk cows were Short-Horn and Short-Horn grades. It is a difficult matter to wean Ephraim from his idols, but this will be necessary in this case before any marked advancement in the returns to dairy farmers will be noticed.

In spite of all that has been said about the importance and value of silage for summer, as well as for winter feeding, and the importance of having green or soiling crops for a time of drought, we find that the average farmer is still unprepared for droughts such as we have had during the past three years in most of our dairy sections. Creameries and cheeseries have been compelled to close at the end of four to six months owing to the sacarcity of cream or milk. This is a heavy loss, not only to the farmers, but to the factorymen and all concerned. One paper estimates a return of $70 per cheese factory patron less in the Ottawa Valley for 1908, as compared with 1907, which latter was a poor year. How much longer is this stupendous loss to continue? Are we never to learn the lesson of the need for providing an abundance of feed for summer as well as winter? The losses in stock sacrificed, lessened milk yield, extra expense to manufacturers, and to the trade generally have been enormous.

We think there has been improvement in the methods of caring for milk and cream, in the discarding of rusty cans, pasteurization of whey, etc., largely due to the personal work of the Dairy Instructors, but much remains to be done yet.

Our creamery business has changed almost entirely from whole milk to cream-gathering. Whether or not this was a wise change remains to be seen. To me it looks like a sacrifice of future reward for a temporary, present gain. We doubt if we shall ever be able to compete with Danish or Irish butter in the British markets so long as we adhere to our present system of collecting cream once or twice a week. In fact, we should not be surprised to see our home market supplied with best Danish, Irish, New Zealand, Australia or Argentine butter in the not distant future.

Our creamery butter has not improved in quality in spite of the strenuous efforts of Instructors and others. The remedy lies largely in the hands of the farmer. Deliver clean, whole milk, or sweet cream of good flavor at the creamery and we'll undertake to guarantee that the butter will improve in quality very fast.

Pasturization was not thought of in Canada, eighteen years ago. Under present conditions, I am firmly convinced that the adoption of this method of handling milk or cream will cause greater improvement in the quality of the finished product than any other one thing which can be done at reasonable expense.

According to the reports published from time to time of the improvement in the quality of cheese made in certain sections, which improvement has been going on for many years, the cheese in these sections must now have reached perfection! We venture to remark that there is still room for improvement. Our home markets for butter have been greatly improved in recent years, as has also the quality of farm dairy butter, due in no small measure to the work of the Travelling Dairies.

The marketing of cheese is in a muddle at present. We think the system is not so good as it was ten or fifteen years ago when the cheese were largely sold to the highest bidder on the Cheese Boards of Trade. The present plan of using the Boards as a "feeler of the market" is not in the best interests of the farmers. Unless there is a radical change in the near future, it looks as if the cheese trade would suffer a setback and the place of many of our factories be taken by creameries or milk condenseries, which latter are the new-

est suppliants for the favors of the dairy farmer. Our growing towns and cities are requiring a great deal more milk and cream for direct consumption, this, together with the erection of large condensing plants in some of our best cheese sections has caused an uneasiness that will not be readily quieted. But what of the future?

Looking Forward.

We have space and time for but a thought or two in this connection. We look for the time when those who sell milk for direct consumption will receive from 8 to 10 cents per quart at the farm for their product when they have fulfilled conditions, which will practically insure a superior product.

We look for a development of the sanitary milk farm, which will cater to a high-class trade and produce milk worth from 15 to 20 cents per quart to the consumer. The consumer will be pleased to pay this price for the milk, as he knows that cheap, dirty milk is dear at any price.

We look further for the development and use of special breeds of dairy cattle for dairy puposes, as is done in Holland, Denmark, Northern Germany, the Channel Islands and every other prominent dairy country. We expect that the young animals will be made immune from tuberculosis, thus removing one of the greatest hindrances to the production of pure milk. This is being done to-day with satisfactory results.

We also expect larger and better equipped creameries and cheeseries with the very best sanitary arrangements and the most skilful men in charge, who will have the benefit of the advice of skilled chemists and bacteriologists. These men can do more for the dairy industry than any other class of men. For illustrations, see the Babcock fat, and the Hart casein testers and the good effects which have followed pasteurization of the whey at cheese factories before its return to the farm.

Finally, we look for an equitable division of the rewards which ought to come to skilled labor and intelligent doing, which are the result of right thinking. The skilful farmer does not receive just rewards to-day. He is compelled to pool results with the unskilful farmer and with manipulators of the market values of dairy products. This ought not to be and cannot continue much longer. If it does, we shall have an upsetting of the laws of equity and justice—the bulwarks of great nations in the past.

For the skilful, intelligent farmer, prospects were never brighter than at present. Land values are increasing and are bound to increase. The land is the basis of all prosperity. The owner of a good farm, stocked with good dairy cows, and who farms with skill and intelligence need envy no man. His profits may be small but they are sure. The time is not far distant when the economic handicap which is placed on him now will be removed from the farmer, then see him move up the social, intellectual and monetary scale!

ORILLIA TOWNSHIP

Special Report on Agricultural Conditions.

By Arthur Peer, Burlington, Ont.

This article deals more particularly with that portion of the township formerly known as South Orillia.

The town of Orillia, which is situated at the Southern extremity of Lake Couchiching, is the leading market for Orillia township and adjoining townships. Leading into the town are four main roads, called the Muskoka Road, the Barrie Road, Coldwater Street and West Street. The sections in Orillia Township that the roads pass through differ somewhat in the nature of the soil, and the line of agriculture followed. Muskoka Road running north along the western shore of Lake Couchiching passes through a rough and broken section. A good deal of the land is extremely rocky, so much so in places as to be unsuitable for general cultivation. Much of this land remains in permanent pasture, and a considerable number of sheep are kept. Along West Street, near to the town, market gardening and fruit growing are the leading branches of agriculture followed. The soil is a sandy loam. Beyond the market garden section the farmers make dairying a specialty, finding a good market in Orillia for the milk produced. The soil is a clay loam along Coldwater Street, and the people are engaged in general farming, such as growing grain and forage crops, and the raising of stock. Along the Barrie Road the soil is a gravel and clay loam. Just outside of Orillia, much of the country is gravelly and remains uncultivated. Beyond this the soil is a clay loam and here general farming is carried on.

Taking the township as a whole, it is inclined to be extremely rolling, and is made up of a variety of soils, from muck to the heaviest of clay. The height of land, running north and south through the township, is of a gravelly nature, and in some places is so rocky as to make the clearing of the soil for cultivation impracticable. Sandy and loaming soils are to be found throughout the township, there being more or less of each on almost every farm.

The farm buildings are in most cases substantial structures. Good, comfortable appearing houses, and modern barns with basement stables, proclaim the thrift and comfort of man and beast. The rapidity with which old structures are disappearing, and new ones taking their places, points to a not very distant date when these primary buildings, the relics of early settlement, will be gone.

All the well known cereal grains are being grown. The field pea, which has never suffered from the ravages of the pea-weevil in this section is extensively grown, but not as much so as in former years owing to the scarcity and high cost of labor at harvesting time, and also because peas have not been doing as well in late years as formerly. During recent years a considerable

Note.—This article on Orillia Township, though dealing with a very restricted area of the Province, need not be at all restricted in its application.

The mistakes here related are mistakes to be avoided or overcome in other townships. The progress which is being made toward successful production as herein given is valuable information for any part of Ontario.

The simple statement that the hogs produced are mainly Yorkshire and Yorkshire grades and that two cars per week are shipped to market, bears weight with the thoughtful producer. Many of the practical and successful farmers of this province have been persistent in their belief that it is easier to find a market and easier to get top price when a good supply of a uniformly good quality of product of any one breed or variety is available in one locality. This means reputation and a better price and a larger profit.

Attention could here be drawn to several other pertinent statements in this report, but we will, in passing, simply draw the reader's attention further to the condition of the apple industry in this township and to the fact that the producers are now organizing to improve conditions and to put this industry on a stable basis. If this article does nothing more than put in a good word for co-operation among the farmers of Ontario it has not been written and published in vain.

quantity of mixed grains has been sown for producing grain for feeding purposes. Much of the hay grown is fed upon the farm the balance finding a ready market in Orillia. A considerable amount of corn is raised for silage. A supply of roots, both of mangels and turnips, is produced for feeding, more attention being given to growing the latter as little damage has been done as yet by the turnip louse.

The herds of cattle in South Orillia township, especially on the farms near the town, are kept chiefly for their dairy productions, either as milk for supplying the town or as butter to meet the demands for local consumption. Cream is also being gatherd and shipped to an outside factory. As one proceeds farther out from the town of Orillia the tendency is more and more towards beef production. The majority of the cattle kept are Shorthorn and Shorthorn grades, with here and there a few Jersey, Holstein, Hereford, or Anjus cattle.

The hogs produced are mainly Yorkshires and Yorkshire grades, the output from Orillia shipping point being two cars per week, with an occasional extra car when the number of hogs offered requires it.

Throughout the greater portion of East Simcoe, many of the farmers keep sheep. One of the greatest drawbacks to this important industry is the dog nuisance. A great many sheep are worried every season, and the loss and constant anxiety for the safety of the flock make it a discouraging business from which many keep out of, who ought otherwise to be making it a profitable source of revenue on their farms.

On many of the farms are to be found fairly good-sized wood lots, ranging in extent from a few acres up to twenty-five or more. From the appearance of the undergrowth they do not seem to have suffered much from excessive pasturing. The hardwoods, particularly maple and beech, predominate, pine having almost disappeared.

A good deal of work is being put upon the roads. A large amount of gravel is being placed upon them, and hills, where it is an advantage to do so are being cut down and the grades improved. Little or no attention has been given to the sides of the roads as yet, other than that they have become a dumping ground for many of the large boulders that have been removed from adjoining fields or from the roadway when it was constructed.

Among the worst weeds the farmers have to contend with in their farming operations are the Bladder Campion, Thistle, Couch Grass, Bindweed, Oxeye Daisy, and Golden Rod.

In the Orillia district the apple has about reached the northern limit where hardy commercial varieties can be successfully grown. At the present time the apple industry in this locality has reached a critical stage. A large proportion of the orchards are from fifteen to twenty years old and have consequently reached an age at which good crops may be expected. Previous to this time, the crop, after satisfying local demands, has not been sufficiently large to warrant the grower in opening up, and catering to outside markets. The small surplus that he had, was sold in local markets, the proceeds of such sales being taken out in trade. The merchant having made a profit on the goods he exchanged for the apples is in a position to accept a smaller profit than he otherwise could do. These merchants, by quoting apples on a small margin of profit to the dealers in the northern markets, have been able to discourage growers who had a sufficient surplus to warrant them in catering to such markets from doing a satisfactory business in this their natural market.

Another custom adopted by some local merchants has not only curtailed the profits of the growers but has also placed the establishing of a direct

trade between grower and dealer in the north on an unsatisfactory and unequal basis. The local merchants, having had little or no outside competition, could practically do business on their own terms. When making a deal for apples, they would agree to furnish the barrels and pay in goods a fixed price for them when returned full to the stores. The barrels sent out were almost invariably second-hand sugar barrels. By this means they obtained an unfair advantage over the grower trying to do business with the regular apple barrel, a package which in the first place is more expensive and in the second, holds less fruit than does the larger and cheaper one with which it must compete.

Coupled with these unsatisfactory market conditions there has been a marked decrease in the amount of first class fruit produced as compared with the increased production of seconds and culls, owing to the constantly increasing ravages of insect and fungi pests. Up to the present time very little has been done to destroy or check the spread of insects or fungi in the orchards. There is no local outlet for the seconds and culls produced, canning factory or vinegar works, hence they are placed upon the general market and lower the tone of the whole apple business. As a result of all these unfavorable circumstances a large proportion of the orchards, particularly the smaller ones, are being almost entirely neglected, an unfortunate condition which will be detrimental in establishing a good reputation for the apple crop of the district. A few, however, of the more enthusiastic and energetic growers have been endeavoring to place the apple industry on a satisfactory and substantial basis. As individuals they find they have not had sufficient influence and strength to overcome adverse conditions and scope with unfavorable competition. They accordingly have lately organized the Orillia Co-operative Shipping Association, by means of which organization they hope to increase the financial returns for their fruit and encourage a more systematic and thorough culture and care of the orchards.

The planting of orchards in the past has been largely an experimental problem, both as regards distance between trees and the varieties to be planted. The orchards as they now exist, contain too many varieties for the best commercial results. Each grower has selected a few trees each of a large list of varieties, so that there is a great lack of uniformity in the make up of the different orchards, and in the case of a great many varieties, scarcely enough apples are produced to make it worth while handling them even when handled in a co-operative way. Among the varieties spoken most highly of as worthy a place in the commercial orchard are the Duchess, Wealthy, Alexander, McIntosh Red, Golden Russett, Scott's Winter, and Pewaukee. In many of the orchards the trees have been planted too closely together, often not more than 18 or 20 feet apart. The trees in some of these orchards are greatly interfering with one another in some instances being so badly interlaced as to almost entirely exclude the sunlight. As a result of this many of the lower limbs are beginning to weaken and die. From a general observation of orchards about thirty feet apart seems to be a satisfactory distance for setting trees in this section. Of the eleven orchards selected for spraying demonstration work, and these represent some of the best orchards of the district, there are two standing in old sod, which is used for pasture; two in old sod which is mown for hay; two seeded down with red clover to be cut for hay; one spring-plowed and planted with garden peas; one spring-plowed but has received no further cultivation. One was planted with corn last year but has received no attention since; one orchard was an old sod part of which was broken up and planted to various hoe crops, the balance remaining to be cut for hay another orchard is partly seeded

down with timothy to be cut for hay, the balance being sown with peas into which hogs will be turned to fatten. At least seventy-five per cent. of the balance of the orchards throughout the district stand in old sod which is either pastured or mown for what it will produce.

In a large number of the orchards, more particularly the smaller ones, little or no attention has been paid to pruning, and particularly no spraying whatever has been done. Of late years the apple scab has become very plentiful in the orchards, entirely destroying for market purposes the fruit of some varieties.

The oyster-shell bark louse has also become a serious pest in some orchards. Some trees have become so thoroughly infested with these insects, that they show a decided loss of vitality, in one or two cases that I noticed being almost dead.

Most of the places visited had a few pear trees. These in almost every instance were the Flemish Beauty, and of late years have been almost entirely worthless, owing to scab.

The plum trees of this section have been almost entirely destroyed by the severe winters of the past few years. Most of the trees are dead, and what remain, present a sickly and damaged appearance. The plum pocket disease is quite prevalent throughout this section.

Only the hardier winter varieties of cherries will succeed, and of these it would not be advisable to plant extensively as a commercial investment, as good paying crops are only obtained about one year in five. However, as a fruit for domestic use, the cherry is worthy of a place on every farm.

Currant and Gooseberry bushes do well here, and in the immediate vicinity of Orillia. Most of the fruit growers and market gardeners grow a few to supply the local demand for these fruits. Mildew and the currant plant louse are among the most serious pests to be dealt with.

A considerable quantity of strawberries are grown in the places just outside of Orillia. The amount of fruit produced is scarcely ever sufficient to supply the local demand.

Several attempts have been made at growing raspberries in a limited way. An excellent growth of cane is made during the season, but unless protected during the winter is very apt to suffer from winter killing. The varieties chiefly grown are the Cuthbert and Columbia.

Only a few blackberries are grown. These are nearly always planted in the orchard or some other protected place. There is only an occasional grape-vine or two to be seen, and these, where they were not protected during the past winter, (and few of them were) are almost certain to be killed to the ground.

ANNUAL REPORT

OF THE

FARMERS' INSTITUTES

OF THE

PROVINCE OF ONTARIO

1907

PART II. MEETINGS AND STATISTICS.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF

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TORONTO.

FARMERS' INSTITUTES OF ONTARIO.

1907-8.

ANNOUNCEMENT OF SUPERINTENDENT.

This volume contains statistics regarding Farmers' Institutes from June to June, 1906-1907, and announcements of meetings, together with names of speakers and subjects for the regular campaign of 1907-08. We have also recorded meetings held during the spring and summer of 1907.

It is gratifying to know that Institute officers have made arrangements for the use of live stock for illustration purposes at many of the Institute meetings during the past season; and from the good results following this method of instruction, we most heartily recommend that officers and directors co-operate in so arranging the work that live animals can be used in illustrating talks upon stock subjects and that samples of seed grain and other farm products be brought to the meetings and used as a basis for discussion and instruction. This Department is making a special effort to still further equip its delegates with illustrative material, thus enabling them to give their instruction in a more clear, systematic and forceful manner.

When there is but one meeting a year at a place (or sometimes two), we cannot hope to leave any great fund of direct information with those who attend the meetings. The instruction imparted in past seasons has undoubtedly proved of great benefit to the localities concerned, far beyond even what one would naturally look for from an isolated meeting. The time has come, however, when we have no hesitation in recommending that officers of institutes and directors use their influence in forming local clubs for the study of such problems as are of special interest in the locality. Quite a number of these have been formed throughout the Province and the benefit derived from the monthly or semi-monthly meetings has been most marked. Such subjects as "Uniformity of crops produced in the locality"; "Co-operation in the purchase of supplies"; "Gathering of the crops and the marketing of the same" should prove of deep interest and profit to the farmers generally. A pamphlet on the organization and work of "Clubs" is being printed.

In order that encouragement might be given to specialization in certain lines of agriculture in given districts, arrangements were made for series of meetings. Recorded in this volume will be found lists of meetings at which special attention was given to the following topics: "Bacon," "Seed production," "Dairying," "Fruit." The devoting of a whole afternoon session to a particular subject, especially when the meeting has been well advertised, assures one of an interested audience, and the results following work of this nature have encouraged us to plan for a greater number of meetings at which one subject only will be dealt with and that treated exhaustively.

It will be noted from the records herein that the whole of the Northern country was served by the summer series of meetings. Speakers were sent to some districts which were never before served by special lecturers sent out by the Department. The settlers in these districts are very appreciative, and both the lecturers and settlers agree in the great good which was accomplished, even by the one series of meetings.

Women's Institutes.

The growth of this branch of the work has continued throughout the past year. Many new organizations have been formed, while a few of the older ones have ceased to hold meetings. The proportion of the latter is less than one would look for at a time when the farmers find it so difficult to get domestic help and when many are prevented from driving to the meetings because of the general use of the main roads for automobiles. The work has been organized in 78 electoral districts and meetings are held regularly at nearly 400 different points. The membership to the end of June last was 10,964. Those who have been longest connected with the work as officers and members are loudest in their praises of the good accomplished and the possibility of even greater benefits being derived in the years to come. This Department has issued a handbook upon Women's Institutes which may be had upon application.

GEO. A. PUTNAM.

REPORTS OF LOCAL FARMERS' INSTITUTES

Institute District.	Membership, December, 1906.	Membership to June, 1907.	No. of Meetings held.	Total Attendance.	No. of papers read or addresses delivered.	Receipts.			
						Cash on hand per last report.	Members' fees.	Grants.	Receipts from conventions and excursions.
						$ c.	$ c.	$ c.	$ c.
1. Addington	75	73	5	349	19	34 74	18 00	50 00	.....
2. Algoma Centre	66	24	6	587	26	91 81	24 00	50 00	.....
3. Algoma East	123	148	6	549	19	41 82	30 75	25 00	.....
4. Algoma, North Shore	56	102	19	855	30	8 34	12 50	25 00	7 60
5. Amherst Island	50	83	3	130	6	86 46	25 00	50 00	.....
6. Brant, North	252	243	10	821	22	95 11	48 60	50 00	82 15
7. Brant, South	364	331	9	937	46	60 06	90 25	50 00	187 70
8. Brockville	179	88	6	590	26	74	22 00	50 00	.....
9. Bruce, Centre	106	104	7	687	27	228 38	28 00	75 00	92 67
10. Bruce, North	123	146	6	314	18	77 90	28 20	50 00	47 55
11. Bruce, South	229	200	9	3,120	33	171 78	57 50	75 00	72 78
12. Bruce, West	291	321	8	1,055	35	207 51	84 25	75 00	68 88
13. Carleton	116	173	9	711	29	101 49	25 75	50 00	.....
14. Cornwall	114	62	4	660	14	20 65	14 25	25 00	.....
15. Dufferin	338	389	12	1,086	63	128 94	88 75	50 00	20 00
16. Dundas	221	262	7	1,111	29	187 80	70 00	50 00	12 45
17. Durham, East	248	221	11	867	32	125 73	55 50	50 00	50 70
18. Durham, West	175	180	10	669	26	217 25	44 75	50 00	90 83
19. Elgin, East	327	247	6	790	34	157 04	65 75	50 00	.....
20. Elgin, West	148	137	6	755	26	38 76	33 25	50 00	113 25
21. Essex, North	185	135	7	635	28	15 80	33 50	75 00	.....
22. Essex, South	164	181	9	693	42	27 42	46 75	50 00	.....
23. Frontenac	142	71	4	606	16	37 64	22 50	50 00	.....
24. Frontenac, Centre	90	77	6	253	8	2 83	16 25	75 00	.....
25. Glengarry	255	325	7	1,885	34	41 56	81 25	50 00	.....
26. Grenville, South	176	140	9	670	32	6 57	34 25	50 00	.....
27. Grey, Centre	288	302	15	1,791	66	48 11	79 30	50 00	98 20
28. Grey, North	350	275	11	1,016	23	102 36	69 00	50 00	56 12
29. Grey, South	284	210	8	2,330	35	86 49	62 00	50 00	152 05
30. Haldimand	433	383	13	1,990	61	410 96	76 25	75 00	199 50
31. Halton	637	522	12	1,414	37	196 52	110 00	50 00	110 00
32. Hastings, East	159	137	9	961	34	19 08	33 75	50 00	40 00
33. Hastings, North	163	245	19	923	35	42	60 50	50 00	.....
34 Hastings, West	65	64	6	473	17	67 33	15 50	50 00	40 00
35. Huron, East	356	347	13	2,049	50	250 86	90 00	50 00	69 02
36. Huron, South	309	308	10	2,921	50	321 70	56 75	75 00	84 33
37. Huron, West	94	192	9	1,548	50	44 50	45 20	50 00	85 47
38. Kent, East	192	175	8	687	39	5 80	45 00	50 00	.....
39. Kent, West	154	176	9	736	35	71 68	37 75	50 00	.....
40. Lambton, East	216	37	12	1,270	32	224 34	44 75	50 00	47 08
41. Lambton, West	296	253	11	1,035	38	189 20	80 75	50 00	47 08
42. Lanark, North	109	88	6	695	20	7 09	21 50	50 00	.....
43. Lanark, South	104	80	9	1,158	53	.....	20 00	50 00	.....
44. Leeds, N., and Grenville	159	81	7	807	12	.....	20 00	50 00	.....
45. Leeds, South	215	168	7	1,130	32	4 95	42 50	50 00	.....
46. Lennox	166	125	9	590	33	53 53	34 25	50 00	.....
47. Lincoln	229	217	9	2,765	44	176 03	52 50	55 00	33 87
48. Manitoulin, East	115	74	7	369	12	15 58	31 25	25 00	.....
49. Manitoulin, West*	168	74	8	613	13	.....	.....	.....	.....
50. Middlesex, East	325	250	11	1,577	37	317 96	76 00	50 00	.....
51. Middlesex, North	353	291	11	2,212	70	297 04	66 50	50 00	87 95
52. Middlesex, West	200	140	7	591	25	106 43	36 25	50 00	.....
53. Monck	138	148	7	691	21	1 80	36 25	55 00	.....
54. Muskoka, Centre	60	70	10	339	21	28 81	18 75	25 00	.....

FOR THE YEAR ENDING JUNE 30, 1907.

Receipts.—*Con.*			Expenditure.											
Miscellaneous.	Balance due Treasurer.	Total Receipts.	Due Treasurer per last report.	Expense for meetings.	Officers' and Secretary's salaries and expenses.	Postage and Stationery.	Printing and advertising.	Lecturers' expenses and wages.	Periodicals for members.	Miscellaneous.	Total expenditure.	Total balance on hand.	No.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
.....	.....	102 74	.....	23 05	20 00	8 80	12 00	3 00	.....	5 00	71 85	30 89	1
.....	.....	165 81	.....	2 50	16 00	2 30	15 20	15 00	.....	3 60	54 60	111 21	2
17 75	.....	115 32	.....	4 00	26 25	1 35	6 60	18 00	.....	20 00	76 20	39 12	3
.....	.....	53 44	.....	.....	10 00	1 90	3 25	.....	.....	.....	15 15	38 29	4
.....	.....	161 46	.....	7 25	21 00	1 70	3 60	3 50	.....	111 25	148 30	13 16	5
.....	.....	275 86	.....	56 11	11 50	1 87	14 55	18 00	.....	29 50	131 53	144 33	6
.....	.....	388 01	.....	73 05	82 00	10 71	41 14	31 50	.....	132 40	370 80	17 21	7
.....	.....	72 74	.....	10 00	24 00	2 25	6 55	10 00	.....	74	53 54	19 20	8
.....	.....	424 05	.....	39 00	74 15	7 75	22 35	6 00	.....	15 00	164 25	259 80	9
.....	.....	203 65	.....	21 35	21 95	8 76	14 00	.....	.....	20 00	86 06	117 59	10
.....	.....	377 06	.....	100 30	40 00	16 00	45 87	.....	.....	7 00	209 17	167 89	11
.....	.....	435 64	.....	2 50	41 30	12 08	24 85	10 00	72 25	98 05	261 03	174 61	12
.....	.....	177 24	.....	58 25	36 75	9 45	16 50	.....	.....	5 85	126 80	50 44	13
.....	.....	59 90	.....	4 50	27 00	2 50	11 00	4 30	.....	2 50	51 80	8 10	14
5 84	.....	293 53	.....	64 07	40 50	4 67	37 55	37 25	.....	.....	184 04	109 49	15
.....	.....	320 25	.....	32 50	40 00	7 72	22 50	28 35	.....	6 05	137 12	183 13	16
.....	.....	281 93	.....	6 00	52 60	7 15	29 00	41 75	.....	6 25	142 75	139 18	17
4 05	.....	406 88	.....	10 60	42 30	2 32	54 85	11 00	.....	21 00	142 07	264 81	18
7 52	.....	280 31	.....	8 50	33 80	2 29	34 60	29 05	.....	19 36	127 60	152 71	19
.....	.....	235 26	.....	15 00	90 30	14 65	39 06	41 29	.....	5 25	205 55	29 71	20
.....	.....	124 30	.....	15 75	15 00	1 45	10 50	18 00	.....	.....	60 70	63 60	21
.....	.....	124 17	.....	15 85	26 00	5 00	10 50	25 80	.....	.....	83 15	41 02	22
.....	.....	110 14	.....	6 50	20 00	4 09	21 71	13 50	.....	.....	65 80	14 34	23
.....	.....	94 08	.....	10 50	25 00	05	10 37	8 50	.....	50	51 92	39 16	24
.....	.....	172 81	.....	28 65	34 50	3 75	59 35	17 00	.....	6 45	149 70	23 11	25
.....	.....	90 82	.....	18 00	25 00	2 67	12 35	7 25	.....	7 74	73 01	17 81	26
11 52	.....	287 13	.....	170 10	32 50	5 33	20 45	2 50	.....	22 22	253 10	34 03	27
14 91	.....	292 39	.....	50 75	53 55	5 70	21 55	19 00	.....	18 00	168 55	123 84	28
102 00	12 75	465 29	.....	100 10	114 85	8 69	59 90	23 10	115 10	43 55	465 29	.....	29
22 34	.....	781 05	.....	87 80	112 30	35 01	69 20	106 20	.....	5 90	416 41	367 64	30
33 92	.....	500 44	.....	68 35	60 00	15 00	43 27	42 60	.....	139 40	368 62	131 82	31
35 00	.....	177 83	.....	48 80	35 00	10 75	20 60	.....	.....	10 00	125 15	52 68	32
.....	.....	110 92	.....	6 50	38 00	5 27	18 25	42 00	.....	50	110 52	40	33
.....	.....	172 83	.....	15 25	40 00	2 50	10 00	19 12	.....	5 00	91 87	80 96	34
10 39	.....	470 27	.....	78 55	51 00	7 43	31 75	37 25	.....	25 70	231 68	238 59	35
.....	.....	537 78	.....	47 35	101 50	5 56	77 62	54 82	.....	61 27	348 12	189 66	36
.....	.....	225 17	.....	53 80	60 00	5 00	12 50	24 15	.....	19 70	175 15	50 02	37
.....	.....	100 80	.....	5 80	20 00	9 23	12 25	46 46	.....	5 00	98 74	2 06	38
2 00	.....	161 43	.....	42 50	43 95	9 15	13 45	33 70	.....	10 00	152 75	8 68	39
.....	.....	366 17	.....	45 05	30 00	7 65	11 00	49 80	.....	22 50	166 00	200 17	40
.....	.....	367 03	.....	60 15	69 96	8 50	23 62	49 20	.....	16 25	227 68	139 35	41
.....	.....	78 59	.....	38 75	21 00	2 74	10 65	.....	.....	.....	73 14	5 45	42
.....	59 68	129 68	25 13	8 50	45 80	4 00	46 25	.....	.....	.....	129 68	.....	43
243 15	50 50	363 65	13 61	34 10	24 00	9 76	20 89	.....	.....	261 29	363 65	.....	44
.....	.....	97 45	.....	44 10	15 00	3 50	13 50	.....	.....	.....	76 10	21 35	45
.....	.....	137 78	.....	62 50	28 00	5 15	12 00	14 00	.....	5 00	126 65	11 13	46
.....	.....	317 40	.....	29 18	30 00	6 79	51 17	23 26	.....	9 00	149 40	168 00	47
.....	.....	71 83	.....	1 50	15 00	2 43	6 55	24 00	.....	.....	49 48	22 35	48
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49
4 38	.....	448 34	.....	101 60	40 00	16 45	37 08	44 15	14 10	21 75	275 13	173 21	50
.....	.....	501 49	.....	75 85	75 00	8 28	23 90	104 95	.....	30 00	317 98	183 51	51
.....	.....	192 68	.....	13 40	37 00	2 67	11 00	18 50	.....	5 10	87 67	105 01	52
.....	2 15	95 20	.....	11 45	27 00	3 15	17 00	31 75	.....	4 85	95 20	.....	53
.....	.....	72 56	.....	35 25	15 35	3 50	9 00	.....	.....	8 00	71 10	1 46	54

REPORTS OF LOCAL FARMERS' INSTITUTES

Institute District.	Membership, December, 1906.	Membership to June, 1907.	No. of Meetings held.	Total Attendance.	No. of papers read or addresses delivered.	Receipts.			
						Cash on hand per last report.	Members' fees.	Grants.	Receipts from conventions and excursions.
						$ c.	$ c.	$ c.	$ c.
55. Muskoka, North	128	128	8	394	19	.....	22 65	25 00	.....
56. Muskoka, South	176	176	9	208	24	16 21	38 75	30 00	.....
57. Port Carling	23	86	2	160	8	1 28	6 00	.....	.....
58. Nipissing, West	55	22	8	368	13	26 70	8 50	25 00	.....
59. Norfolk, North	325	288	10	1,510	51	166 02	75 75	50 00	96 83
60. Norfolk, South	171	126	5	362	14	12 44	32 00	50 00	60 68
61. Northumberland, East	215	233	7	1,280	26	6 04	59 00	50 00	11 85
62. Northumberland, West	155	120	6	1,080	32	76 76	33 25	50 00	8 97
63. Ontario, North	157	187	10	538	36	212 77	36 50	25 00	.....
64. Ontario, South	288	249	14	905	45	93 74	66 25	75 00	133 47
65. Oxford, North	277	286	11	1,690	50	117 05	72 00	50 00	179 65
66. Oxford, South	505	491	10	1,823	51	4 53	130 25	50 00	137 45
67. Parry Sound, East	244	50	16	885	60	121 61	50 00	43 00	144 25
68. Parry Sound, West*	6	147	9	310	10	.....	.....	.....	.....
69. Peel	404	493	15	2,464	75	94 61	97 00	60 00	183 85
70. Perth, North	297	345	9	2,040	32	179 51	87 00	50 00	171 70
71. Perth, South	307	453	8	2,605	37	323 69	113 00	50 00	.....
72. Peterborough, East	118	113	9	1,564	42	.....	27 75	50 00	50 70
73. Peterborough, West	192	199	11	1,354	55	30 39	47 50	50 00	59 20
74. Prescott	71	79	5	268	15	80 42	11 75	50 00	.....
75. Prince Edward	232	173	11	674	21	61 22	42 75	50 00	.....
76. Rainy River, South	123	93	9	283	15	20 30	33 25	25 00	.....
77. Renfrew, North	92	88	7	720	15	....	43 00	50 00	.....
78. Renfrew, South	104	.....	6	385	24	97 28	23 75	50 00	.....
79. Russell	140	143	9	1,170	36	2 97	28 75	50 00	.....
80. Simcoe, Centre	347	410	11	1,604	51	253 07	81 00	50 00	.....
81. Simcoe, East	189	161	8	510	25	101 29	45 75	55 00	141 50
82. Simcoe, South	149	172	9	794	32	.....	45 75	50 00	50 00
83. Simcoe, West*	250	235	8	1,190	30	.....	.....	.....	.....
84. St. Joseph Island	211	94	9	857	21	7 29	29 50	25 00	60
85. Stormont	166	99	4	485	10	.....	26 25	50 00	.....
86. Temiscamingue*	212	12	10	247	13	.....	.....	.....	.....
87. Victoria, East	147	194	7	1,203	29	.....	36 75	60 00	5 10
88. Victoria, West	111	149	7	837	37	25 72	42 65	50 00	26 28
89. Waterloo, North	566	584	26	3,240	55	86 99	142 50	50 00	85 15
90. Waterloo, South	810	620	15	2,727	52	46 93	193 00	50 00	108 43
91. Welland	371	298	11	1,066	37	289 68	74 50	50 00	141 03
92. Wellington, Centre	644	666	11	2,390	40	122 75	185 50	50 00	26 60
93. Wellington, East	335	365	9	1,620	58	54 30	94 75	50 00	21 00
94. Wellington, South	327	359	7	1,040	16	98 78	491 25	50 00	.....
95. Wellington, West	291	252	9	2,848	32	208 77	68 75	50 00	.....
96. Union	187	112	7	1,215	27	141 65	29 25	37 50	40 35
97. Wentworth, North	266	279	10	1,357	36	.....	72 50	75 00	.....
98. Wentworth, South	316	326	10	2,137	60	.....	83 50	75 00	58 10
99. York, East	303	195	15	1,134	45	121 80	60 50	50 00	.....
100. York, North	103	120	7	296	22	83 11	31 56	50 00	.....
101. York, West	221	195	7	762	32	80 55	64 25	50 00	129 25
Totals:						$	$	$	$
1906–7	22,277	20,540	914	110,765	3,271	8,731	5,550	4,795	4,069
1905–6	20,186	21,052	910	126,084	3,497	9,321	5,631	4,397	5,150
1904–5	22,703	19,793	845	102,068	3,209	9,535	5,009	4,596	4,316
1903–4	23,799	21,257	833	106,719	3,165	8,663	5,636	4,698	6,352

* Complete returns not received.

FOR THE YEAR ENDING JUNE 30, 1907.—*Continued.*

Receipts.—*Con.*			Expenditure.											
Miscellaneous.	Balance due Treasurer.	Total Receipts.	Due Treasurer per last report.	Expense for meetings.	Officers' and Secretary's salaries and expenses.	Postage and Stationery.	Printing and advertising.	Lecturers' expenses and wages.	Periodicals for members.	Miscellaneous.	Total expenditure.	Total balance on hand.	No.
$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	$ c.	
.....	12 44	60 09	17 85	.....	29 00	5 74	1 75	.....	.....	5 75	60 09	.....	55
.....	12 71	97 67	.....	36 80	25 00	3 00	12 60	6 95	.....	.....	84 35	13 32	56
.....	.....	7 28	.....	.....	.....	1 50	1 25	.....	2 25	10	5 10	2 18	57
.....	.....	60 20	.....	13 80	21 45	2 75	7 70	.....	.....	.....	45 70	14 50	58
.....	.....	388 60	.....	125 03	50 00	9 87	32 25	18 00	.....	17 50	252 65	135 95	59
.....	.....	155 12	.....	23 80	47 80	3 66	14 00	7 20	.....	3 55	100 01	55 11	60
65 00	2 35	194 24	.....	20 00	45 70	6 80	21 75	.....	.....	99 99	194 24	.....	61
.....	.....	168 98	.....	35 00	18 00	4 65	11 00	22 15	.....	17 50	108 30	60 68	62
20 25	.....	294 52	.....	87 45	82 00	3 45	26 75	.....	.....	32 10	231 75	62 77	63
.....	.....	368 46	.....	21 25	66 75	14 74	40 20	52 20	.....	7 65	202 79	165 67	64
.....	.....	418 70	.....	57 00	47 85	4 70	88 70	105 15	.....	6 95	310 35	108 35	65
4 07	.....	326 30	.....	34 85	59 93	32 43	106 44	47 60	.....	26 22	307 47	18 83	66
.....	.....	358 86	.....	123 05	55 80	14 15	34 00	15 00	.....	21 85	263 85	95 01	67
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	68
1 65	.....	437 11	.....	139 35	66 65	9 58	102 80	32 50	.....	10 80	361 68	75 43	69
5 00	.....	493 21	.....	53 81	75 85	17 16	57 23	29 75	.....	68 11	301 91	191 30	70
176 90	.....	663 59	.....	82 70	93 15	7 78	31 35	16 70	.....	16 70	248 38	415 21	71
.....	.....	128 45	4 81	26 75	39 00	2 55	25 30	26 50	.....	.....	124 91	3 54	72
2 00	.....	189 09	.....	45 75	38 75	8 00	50 95	17 70	.....	4 50	165 65	23 44	73
.....	.....	142 17	.....	18 25	20 00	3 55	22 85	.....	.....	5 00	69 65	72 52	74
5 32	.....	159 29	.....	11 30	20 00	2 13	23 90	51 65	.....	.....	108 98	50 31	75
.....	.....	78 55	.....	14 55	12 50	2 14	5 00	.....	.....	.....	31 19	44 36	76
.....	.....	93 00	16 69	19 45	25 00	13 87	6 70	.....	.....	10 00	91 71	1 29	77
.....	.....	171 03	.....	3 00	26 20	3 87	40 03	7 70	.....	15	80 95	90 08	78
.....	.....	81 72	.....	10 00	32 00	7 00	10 00	18 00	.....	.....	77 00	4 72	79
162 50	.....	546 57	.....	126 80	75 10	13 24	35 80	24 00	.....	21 50	296 44	250 13	80
3 50	.....	347 04	.....	52 25	45 33	16 40	101 75	13 55	.....	5 65	284 93	112 11	81
.....	.....	145 75	7 05	17 50	27 65	4 35	26 25	15 75	.....	15 20	113 75	32 00	82
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	83
.....	.....	62 39	.....	13 04	25 00	3 28	6 25	.....	.....	.....	47 57	14 82	84
.....	.....	76 25	25	14 25	21 35	2 40	12 00	9 00	.....	2 50	61 75	14 50	85
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86
.....	11 11	112 96	11 44	36 00	20 00	8 37	19 50	17 65	.....	.....	112 96	.....	87
.....	.....	144 65	.....	32 15	29 30	9 21	17 75	8 25	10 20	.....	106 86	37 79	88
.....	.....	364 64	.....	65 50	90 00	23 25	27 94	66 50	.....	18 15	291 34	73 30	89
45	2 17	400 98	.....	91 20	147 00	8 98	39 00	30 00	.....	84 80	400 98	.....	90
.....	.....	555 21	.....	51 95	62 60	5 00	18 90	54 40	.....	111 05	306 90	248 31	91
.....	.....	384 25	.....	93 06	46 40	13 97	35 90	43 55	.....	39 15	272 03	112 22	92
6 00	17 87	243 92	.....	23 25	16 60	6 00	37 75	82 27	16 50	31 55	243 92	.....	93
8 95	.....	648 98	.....	12 90	61 50	10 75	26 85	2 00	.....	451 50	565 50	83 48	94
1 50	.....	329 02	.....	73 30	31 65	10 00	28 80	23 15	.....	7 00	173 90	155 12	95
5 65	.....	254 40	.....	15 75	30 00	2 40	21 65	20 80	.....	27 00	117 60	136 80	96
.....	.....	147 50	17 80	37 75	37 50	5 85	13 05	12 10	.....	7 00	131 05	16 45	97
.....	.....	216 60	16 95	28 00	91 20	14 35	53 50	.....	.....	9 33	213 33	3 27	98
3 70	.....	236 00	.....	26 05	66 55	10 51	36 05	21 50	.....	35 00	195 66	40 34	99
.....	.....	164 61	.....	35 90	25 00	13 54	25 71	.....	.....	20 30	120 45	14 16	100
.....	.....	324 05	.....	14 65	59 20	21 50	47 25	22 15	.....	68 40	233 15	90 90	101
$	$	$	$	$	$	$	$	$	$	$	$	$	
987	184	24,316	132	3,835	4,170	741	2,690	2,150	230	2,586	16,534	7,782	
495	149	25,143	141	3,673	4,039	712	2,770	1,793	.....	3,102	16,230	8,913	
463	141	24,061	112	2,959	3,912	666	2,552	1,736	.....	2,803	14,740	9,321	
530	112	25,991	143	3,532	3,813	791	2,726	2,550	.....	2,895	16,450	9,541	

ATTENDANCE, MEMBERSHIP, Etc., 1906-1907.

The membership for the six months ending with June, 1907, compares favorably with that of the corresponding period of 1906. The total attendance for the season of 1906-1907 was not quite so great as during the preceding year. This falling off in attendance should not, however, be taken as an indication of waning interest in the work. Many of the delegates report that there was an increased interest shown on the part of the farmers, and that the good accomplished was greater than in former seasons. On account of the scarcity of labor and the removal of many of Ontario Farmers to the North-West, the numbers in attendance was not so large as some other years.

The Institutes holding the largest number of meetings during the year ending May 31st, 1907, are :—

Waterloo, N	26	Halton	12	Wellington, C	11
Algoma, North Shore	19	Lambton, E	12	Brant, N	10
Hastings, N	19	Durham, E	11	Durham, W	10
Parry Sound, E	16	Grey, N	11	Huron, S	10
Grey, C	15	Lambton, W	11	Muskoka, C	10
Peel	15	Middlesex, E	11	Norfolk, N	10
Waterloo, S	15	Middlesex, N	11	Ontario, N	10
York, E	15	Oxford, N	11	Oxford, S	10
Ontario, S	14	Peterboro, W	11	Wentworth, N	10
Haldimand	13	Prince Edward	11	Wentworth, S	10
Huron, E	13	Simcoe, C	11	Brant, S	9
Dufferin	12	Welland	11	Bruce, S	9

The Institutes having the largest attendance at their meetings are as follows :—

	No. of Meetings.	No. in Attendance.		No. of Meetings.	No. of Attendance.
Waterloo, N	26	3,240	Peel	15	2,464
Bruce, S	9	3,120	Wellington, C	11	2,390
Huron, S	10	2,921	Grey, S	8	2,330
Wellington, W	9	2,848	Middlesex, N	11	2,212
Lincoln	9	2,765	Wentworth, S	10	2,137
Waterloo, S	15	2,727	Huron, E	13	2,049
Perth, S	8	2,605	Perth, N	9	2,040

The Institutes having the largest Membership to June, 1907, are :

Wellington, C	666	Dufferin	389	Glengarry	325
Waterloo, S	620	Haldimand	383	Bruce, W	321
Waterloo, N	584	Wellington, E	365	Huron, S	308
Halton	522	Wellington, S	359	Grey, C	302
Peel	493	Huron, E	347	Welland	298
Oxford, S	491	Perth, N	345	Middlesex, N	291
Perth, S	453	Brant, S	331	Norfolk, N	288
Simcoe, C	410	Wentworth, S	326	Oxford, N	286

Institutes having smallest membership up to June, 1907, are :—

Nipissing, W	22	Hastings, W	64	Manitoulin, W	74
Algoma, C	24	Muskoka, C	70	Frontenac, C	77
Lambton, E	37	Frontenac	71	Prescott	79
Parry Sound, E	50	Addington	73	Lanark, S	80
Cornwall	62	Manitoulin, E	74	Leeds, N. & Grenville	81

SPECIAL NORTHERN MEETINGS HELD IN 1907.

Mr. W. F. Kydd, Simcoe, June 4 to July 17; Mrs. Colin Campbell, Windsor, June 4 to July 2; Mrs. L. Gray-Price, Toronto, July 3 to 17.

1	Stisted, Township Hall (afternoon)	N. Muskoka	June	4
2	Aspdin, Clifton Hall (evening)	N. Muskoka	"	4
3	Ravenscliffe, Patron Hall	N. Muskoka	"	5
4	Huntsville, Court House	N. Muskoka	"	6
5	Brunel, No. 5 School House	N. Muskoka	"	7
6	Birkendale, The Hemlock	N. Muskoka	"	8
7	Hillside, School House	N. Muskoka	"	10
8	Novar, Cowan's Hall	N. Muskoka	"	11
9	Callender, White's Hall	E. Parry Sound	"	12
10	Powassan, Stewart's Hall	E. Parry Sound	"	13
11	Nipissing, School House	E. Parry Sound	"	14
12	Restoule, School House	E. Parry Sound	"	15
13	Loring, Russell Hall	E. Parry Sound	"	17
14	Arnstein, School House	E. Parry Sound	"	18
15	Golden Valley, School House	E. Parry Sound	"	19
16	Granite Hill	E. Parry Sound	"	20
17	Trout Creek, Trussler's Hall	E. Parry Sound	"	21
18	South River, Vincent's Hall	E. Parry Sound	"	22
19	Sundridge, Orange Hall	E. Parry Sound	"	24
20	Burk's Falls, Sharp's Hall	E. Parry Sound	"	25
21	Maganetawan, Orange Hall (afternoon)	E. Parry Sound	"	26
22	Midlothian, School House	E. Parry Sound	"	27
23	Doe Lake, School House	E. Parry Sound	"	28
24	Emsdale, Agricultural Hall	E. Parry Sound	"	29
25	Four Mile Lake (afternoon)	W. Nipissing	July	1
26	Widdifield, Hall (evening)	W. Nipissing	"	1
27	Woodlands, School House	W. Nipissing	"	2
28	New Liskeard Orange Hall	Temiskaming	"	3
29	Hillview, School House	Temiskaming	"	4
30	Milberta, Newton's Hall	Temiskaming	"	5
31	Uno Park, School House	Temiskaming	"	6
32	Hanbury, School House	Temiskaming	"	8
33	Thornloe	Temiskaming	"	9
34	Barlton, School House	Temiskaming	"	10
35	Heaslip, School House	Temiskaming	"	11
36	Hilliardstown, School House	Temiskaming	"	12
37	Judge, School House	Temiskaming	"	13
38	Tomstown	Temiskaming	"	15
39	Charlton	Temiskaming	"	16
40	Haileybury, Orange Hall	Temiskaming	"	17

H. Glendinning, Manilla, June 5 to 14; D. Anderson, Orillia, June 17 to July 17; Miss Agnes Smith, Hamilton, June 5 to July 17.

1	Desbarats, Orange Hall	North Shore Algoma	June	5
2	McLennan, Macabee Hall	North Shore Algoma	"	6
3	Bar River	North Shore Algoma	"	7
4	Echo Bay, Orange Hall	North Shore Algoma	"	8
5	Tarantorus, School House	Centre Algoma	"	10
6	West Korah, School House	Centre Algoma	"	11
7	Bass Line School House	Centre Algoma	"	12
8	Goulais Bay, School House	Centre Algoma	"	13
9	East Korah, School House	Centre Algoma	"	14
10	Paipoonge, School House No. 1	Thunder Bay	"	17
11	Nolalu	Thunder Bay	"	18
12	Hymers, Orange Hall	Thunder Bay	"	19
13	O'Conner, School House No. 1	Thunder Bay	"	20
14	Stanley, School House No. 2	Thunder Bay	"	21
15	Murillo, Town Hall	Thunder Bay	"	22
16	Dryden, Humphrey's Hall	Rainy River North	"	24
17	Oxdrift	Rainy River North	"	25
18	Eagle River, Town Hall	Rainy River North	"	26
19	Kenora	Rainy River North	"	27
20	Rainy River, Town Hall	Rainy River South	July	2
21	Rapid River, A. J. Hunter's	Rainy River South	"	3
22	Pinewood, School House	Rainy River South	"	4

SPECIAL NORTHERN MEETINGS.—*Continued.*

23	Stratton, Public Hall	Rainy River South	July	5
24	Barwick, Weston's Hall	Rainy River South	"	6
25	Emo, McEachren's Hall	Rainy River South	"	8
26	Devlin, Foresters' Hall	Rainy River South	"	9
27	La Vallee, Saunder's Hall	Rainy River South	"	10
28	Crozier, School House	Rainy River South	"	11
29	Fort Francis, Town Hall	Rainy River South	"	12
30	Isherwood, School House (afternoon)	Rainy River South	"	13
31	Ouimet	Thunder Bay	"	16
32	Wolf River	Thunder Bay	"	17

H. G. Reed, V.S., Georgetown and Miss L. Shuttleworth, Guelph.

1	Little Current (Women's Inst. mtg. only)	E. Manitoulin	May	29
2	Green Bay, School House	E Manitoulin	"	30
3	Manitowaning, Agricultural Hall	E. Manitoulin	"	31
4	Wikwemikong, Council Chambers	E. Manitoulin	June	1
5	The Slash, School House	E. Manitoulin	"	3
6	Tehkummah, School House	E. Manitoulin	"	4
7	Big Lake	E. Manitoulin	"	5
8	Mindemoya, School House	E. Manitoulin	"	6
9	Grimesthorpe, School House	W. Manitoulin	"	7
10	Kagawong, No. 1 School House (afternoon)	W. Manitoulin	"	8
11	Kagawong, Hilliard's Hall (evening)	W. Manitoulin	"	8
12	Ice Lake, School House	W. Manitoulin	"	10
13	Gore Bay, Foresters' Hall (afternoon)	W. Manitoulin	"	11
14	Gordon's School House (evening)	W. Manitoulin	"	11
15	Barrie Island, School House	W. Manitoulin	"	12
16	Poplar, School House	W. Manitoulin	"	13
17	Evansville, School House	W. Manitoulin	"	14
18	Silver Water, Foresters' Hall	W. Manitoulin	"	15
19	Richard's Landing, Town Hall	St. Joseph Is.	"	18
20	Kentvale, Kent's Hall	St. Joseph Is	"	19
21	Carterton, Town Hall	St. Joseph Is	"	20
22	Marksville, Town Hall	St. Joseph Is		21-22
23	Alma Heights, School House	E. Algoma	"	24
24	Little Rapids, School House	E. Algoma	"	25
25	Livingstone's Creek, School House	E. Algoma	"	26
26	Sowerby, Macabee's Hall	E. Algoma	"	27
27	Goldenburg, School House	E. Algoma	"	28
28	Iron Bridge, Orange Hall	E. Algoma	"	29
29	Wallford	E. Algoma	July	2
30	Dunchurch	W. Parry Sound	"	4
31	Broadbent	W. Parry Sound	"	5
32	Parry Sound	W. Parry Sound	"	6
33	Carling	W. Parry Sound	"	8
34	McDougal	W. Parry Sound	"	9

SPECIAL SERIES IN N. VICTORIA, HALIBURTON AND N. PETERBORO.

Mr. Jno. Campbell, Woodville, and Miss G. Carter, Guelph.

1	Dalrymple, Orange Hall	N. Victoria	June	11
2	Uphill	N. Victoria	"	12
3	Head Lake, Township Hall	N. Victoria	"	13
4	Norland, Foresters' Hall	N. Victoria	"	14
5	Coboconk, C.O.O.F. Hall	N. Victoria	"	15
6	Kirkfield, McKenzie's Hall	N. Victoria	"	17
7	Haliburton, Town Hall	Haliburton	"	19
8	Minden, Town Hall	Haliburton	"	20
9	Irondale, School House	Haliburton	"	21
10	Deer Lake, No. 3 and 4 School House	Haliburton	"	24
11	Wilberforce	Haliburton	"	25
12	Tory Hill, School House	Haliburton	"	26
13	Gooderham, Orange Hall	Haliburton	"	27
14	Galway, School House	Haliburton	"	28
15	Kinmount	Haliburton	"	28
16	South Burleigh, School House	N. Peterboro	July	2
17	Apsley, Town Hall	N. Peterboro	"	3
18	Lasswade, School House	N. Peterboro	"	4
19	Clydesdale, School House	N. Peterboro	"	5

SPECIAL SERIES, WEST NIPISSING.

Denis Rocheleau, Tecumseh.

R.C.S.S., Widdifield Township	May 28
Sturgeon Falls	" 29
Verner	" 30
St. Charles	" 31
Warren	June 1
P.S.S., No. 2, Widdifield Township	" 3

SPECIAL MEETINGS HELD IN THE INTERESTS OF BACON PRODUCTION.

These meetings consisted of afternoon sessions only, and only one subject, Bacon Hogs, was dealt with. A part of the advertisement, which announced these meetings, is given herewith :—

Every Farmer should Attend at least One
of the Special Meetings in the Interests of The Production of

A Greater Quantity and a Better Quality

—of—

BACON HOGS.

One Session only at Each Place. 1.30 p.m.

LIVE ANIMALS

Will be Used to Illustrate The Lessons Taught.

The Provincial Department of Agriculture and the Local Farmers' Institutes are co-operating in the holding of the above meetings with the view of instructing the farmers as to the desirable type of Bacon Hog, the best way to secure that type, methods of feeding, care, etc. There is a sufficient number of the thick, fat type produced now, and any increase in the output should be of the approved bacon type. Every farmer should take advantage of the special instruction which is being furnished.

The delegate in attendance will give lectures on breeding, feeding, etc., as well as practical demonstrations in the judging of hogs.

Meetings attended by Dr. J. Standish, Walkerton, Ont.

Algonquin	April 4th
Lyn	" 5th
*Brockville	" 6th
Iroquois	" 8th
Morrisburg	" 9th
*North Williamsburg	" 10th
Moulinette	" 11th
*Cornwall	" 12th
Northfield	" 13th
Chesterville	" 15th
*Winchester	" 16th
Mountain	" 17th
*Finch	" 18th
Avonmore	" 19th
Monkland	" 20th
Aultsville	" 22nd

Meetings attended by Duncan Anderson, Orillia, Ont.

*Lancaster	April 4th
Martintown	" 5th
Bainsville	" 6th
Glen Robertson	" 8th
*Alexandria	" 9th
Maxville	" 10th
S. Lenard	" 11th
*Vars	" 12th
Russell	" 13th
Smith's Falls	" 15th
*Perth	" 16th
Balderson	" 17th
Merrickville	" 18th
Burritt's Rapids	" 19th
*Kemptville	" 20th

Arrangements were made for holding Auction sales of pure bred hogs at the places indicated thus "*," from 5 days to two weeks after the meetings had been held in the surrounding district.

SPECIAL DAIRY MEETINGS.

The Institute Branch of the Department co-operated with the Eastern Dairymen's Association in holding meetings in November and December, 1906, in each of the Districts indicated below, for the purpose of nominating a representative for each District to the Board of Directors of the Eastern Dairymen's Association. In this way the Board of Directors was made truly representative of the whole of Eastern Ontario. The method adopted has proved highly satisfactory to the dairymen in general, and has proved of considerable assistance to the Department in the co-operation received from the directors in holding special dairy meetings, and in carrying on the work of dairy instruction. The Association has taken over the work of district meetings, and while the Department still consults with its representatives, and gives assistance to a limited extent, the Association will bear all the expenses connected with the district meetings. An effort is being made to render these district meetings of special interest not only to the makers and manufacturers, but to the producers as well.

Dairy Districts.	*Places of Meeting.*		
	1906	1907	
Glengarry	*Lancaster	Alexandria	Nov. 14
Prescott	*Vankleek Hill	Vankleek Hill	Dec. 11
Stormont	Avonmore	Newington	Nov. 28
Russell	Russell	Russell	Dec. 12
Dundas	*N. Williamsburg	Winchester Springs	Nov. 29
Carleton	Stittsville	Stittsville	Nov. 22
Renfrew	Cobden	Renfrew	Dec. 17
Lanark	*Perth	Almonte	Nov. 21
Grenville (including Elmsley, Kitley and Elizabethtown townships in Leeds)	Kemptville		
	*N. Augusta	Kemptville	Nov. 27
Leeds (except above townships)	*Elgin	Elgin (eve.)	Nov. 19
Frontenac	Inverary	Kingston	Nov. 16
Lennox & Addington	*Enterprise	Napanee	Nov. 9
Prince Edward (including Sydney, Thurlow and Tyendinaga townships in Hastings)	Belleville	Picton	Oct. 30
Hastings (except above townships)	*Springbrook	Madoc	Nov. 12
Peterboro	*Peterboro	Peterboro	Nov. 6
Northumberland	Campbellford	Warkworth	Nov. 8
Haliburton	*Lindsay	Lindsay	Nov. 7

At those places indicated thus "*" the Dairy and Institute meetings were held conjointly.

SPECIAL SEED MEETINGS.

The Dominion and Provincial Departments of Agriculture again co-operated in holding special seed meetings from June 7th to 26th inclusive. The chief topics for discussion at these meetings were the "Improvement of Seed," and the "Eradication of Weeds."

List of Meetings.

Division 1. Nestleton, Taunton, Bowmanville, Kendal, Napanee, Belleville, Centreville, Tweed, Madoc, Warkworth, Westwood, Keene, Lindsay, Fenelon Falls, Woodville, Oakwood, Little Britain, Stouffville.

Division 2. Maple, Weston, Box Grove, Agincourt, Victoria Square, Huttonville, Claude, Mono Mills, Elmgrove, Stroud, Penetanguishene, Randolph, Wyevale, Flesherton, Stayner, Duntroon, Meaford.

Speakers employed were Mr. Simpson Rennie, Mr. T. H. Mason and Mr. T. G. Raynor.

The attendance at these special meetings was not so large as during the previous season. The late spring and scarcity of farm labor no doubt had much to do in lessening the attendance.

SPECIAL MEETINGS FOR FRUIT GROWERS.

Delegates :—A. E. Sherrington, Walkerton ; M. R. Baker, B.S.A., Fruit Division, Department of Agriculture, Ottawa.

Meaford	Grey	March	14
Thornbury	Grey	"	15
Collingwood	Simcoe	"	16
Penetanguishene	Simcoe	"	18
Midland	Simcoe	"	19
Orillia	Simcoe	"	20
Pickering	Ontario	"	21
Brooklin	Ontario	"	22
Oshawa	Ontario	"	23
Newcastle	Durham	"	25
Orono	Durham	"	26
Canton	Durham	"	27
Brighton	Northumberland	"	28
Belleville	Hastings	"	29
Bowmanville	Durham	"	30

Delegate :—A. E. Sherrington, Walkerton.

Leamington	Essex	April	16
Oro	Simcoe	June	13
Hawkestone	Simcoe	June	14
Crown Hill	Simcoe	June	15
Frankford	Hastings	June	18
Wellman's Corners	Hastings	June	19

Delegates :—D Johnson, Forest ; A Gifford, Meaford.

Tara	Bruce	March	12
Allenford	Bruce	"	13
Port Elgin	Bruce	"	14
Paisley	Bruce	"	15
Underwood	Bruce	"	16

Delegate :—A. Gifford, Meaford.

Mildmay	Bruce	March	20
Harriston	Wellington	"	21
Georgetown	Halton	"	22
Milton	Halton	"	23
Mount Nemo	Halton	"	25
Burlington	Halton	"	26
Cainsville	Brant	"	27
Hatchley Sta	Brant	"	28
Burgessville	Oxford	"	29

Delegate :—D. Johnson, Forest.

Jordan Harbor	Lincoln	Feb.	21

Delegates :—W. D. A. Ross, Chatham ; P. J. Carey, Toronto.

Ilderton	Middlesex	March	20
Forest	Lambton	"	21
Thedford	Lambton	"	22
Arkona	Lambton	"	26
Watford	Lambton	"	27
Wyoming	Lambton	"	28

Delegate :—J. L. Hilborn, Leamington.

Jordan	Lincoln	March	12
Pelham Centre	Monck	"	13
Niagara Falls	Welland	"	14

INSTITUTE MEETINGS AND DELEGATES THEREFOR.

REGULAR MEETINGS, 1907-08.

DIVISION 1. J. Gardhouse, Highfield, Ont., Jan. 8 to Feb. 1; W. F. Kydd, Simcoe, Ont., Jan. 10 to 25; Jas. Cornell, Scarboro, Jan. 27 to Feb. 1; Dr. Backus, Aylmer, Jan. 8, 9, 17, 18, 22, 23, 27, 29 and 30.

1	Kincardine, Town Hall	Centre Bruce	January 8
2	Ripley, Township Hall	Centre Bruce	" 9
3	Holyrood, Township Hall	South Bruce	" 10
4	Belmore, Foresters' Hall	South Bruce	" 11
5	Auburn, Orange Hall	West Huron	" 13
6	Kintail, Young's Hall	West Huron	" 14
7	Brussells, Town Hall	East Huron	" 15
8	Gorrie, Town Hall	East Huron	" 16
9	Durham, Town Hall	South Grey	" 17
10	Hanover, Telford's Hall	South Grey	" 18
11	Wiarton, Town Hall	North Bruce	" 20
12	Hepworth, No. 6 School House	North Bruce	" 21
13	Tara, Council Chambers	West Bruce	" 22
14	Port Elgin, Town Hall	West Bruce	" 23
15	Lakelet, Temperance Hall	Union	" 24
16	Lavery's School House	Union	" 25
17	Nassagaweya, Brooksville Hall	Halton	" 27
18	Kilbride, Town Hall	Halton	" 28
19	Nelson Village, McGregor's Hall	Halton	" 29
20	Bronte, Orange Hall	Halton	" 30
21	Postville, Council Chambers (Trafalgar P.O.)	Halton	" 31
22	Sheridan, Temperance Hall	Halton	February 1

DIVISION 2. W. F. Kydd, Simcoe, Ont., Jan. 7 to 9, 27 to 29; G. Barbour, Crosshill, Jan. 10 to 25; W. J. Lennox, Newton Robinson, Jan. 11 to 17; J. W. Widdifield, Jan. 18 to 24; Prof. R. Harcourt, O.A.C., Jan. 7 to 10; Miss L. Shuttleworth, Guelph, Jan. 9 to 17 and 24 to 29.

1	Shakespeare, Temperance Hall	North Perth	January 7
2	Milverton, Cook's Hall	North Perth	" 8
3	Mitchell, Town Hall	South Perth	" 9
4	St. Mary's, Town Hall	South Perth	" 10
5	Brucefield, Dixon's Hall	South Huron	" 11
6	Exeter, Town Hall	South Huron	" 13
7	Coldstream, Town Hall	North Middlesex	" 14
8	Beechwood, Grange Hall	North Middlesex	" 15
9	Ailsa Craig, Town Hall	North Middlesex	" 16
10	Parkhill, Town Hall	North Middlesex	" 17
11	Middlemiss, Village Hall	West Middlesex	" 18
12	Walker's School House	West Middlesex	" 20
13	Alvinston	East Lambton	" 21
14	Inwood, Orange Hall	East Lambton	" 22
15	Petrolea, Town Hall	West Lambton	" 23
16	Brigden, McKenzie Hall	West Lambton	" 24
17	Kintore, Company's Hall	North Oxford	" 25
18	Thorndale, Harding's Hall	East Middlesex	" 27
19	Harrietsville, Foresters' Hall	East Middlesex	" 28
20	Bright, Duncan's Hall	North Oxford	" 29

DIVISION 3. E. C. Drury, Crown Hill, Jan. 7 to 15; A. E. Sherrington, Walkerton, Jan. 11 to 27; J. O. Duke, Ruthven, Jan. 16 to 27; Mrs. C. Campbell, Windsor, Jan. 7 to 14, 18 to 20, 23 to 27.

1	Beatton, Beatton's Hall	North Norfolk	January 7
2	Waterford, Town Hall	North Norfolk	" 8
3	Delhi, Morgan's Hall	North Norfolk	" 9
4	Courtland, Town Hall	North Norfolk	" 10
5	Norwich, Town Hall	South Oxford	" 11
6	Mt. Elgin, Foresters' Hall	South Oxford	" 13
7	Aylmer, Opera House	East Elgin	" 14&15

REGULAR MEETINGS.—*Continued.*

8	Shedden, Morrison's Hall	West Elgin	January	16
9	West Lorne, Township Hall	West Elgin	"	17
10	Kent Centre, Harwick's Hall	East Kent	"	18
11	Croton, Town Hall	East Kent	"	20
12	Tupperville, Church	West Kent	"	21
13	Eberts, Township Hall	West Kent	"	22
14	S. Woodslee, St. Lawrence Hall	North Essex	"	23
15	Essex, Town Hall	South Essex	"	24&25
16	Oldcastle, Town Hall	North Essex	"	27

DIVISION 4. T. H. Race, Mitchell, Jan. 7 to 14; Erland Lee, Stoney Creek, Jan. 7 and 8; Anson Groh, Preston, Jan. 9 to 14; J. L. Hilborn, Leamington, Ont., Jan. 15 to 21; W. C. Shearer, Bright, Jan. 15 to 30; J. C. Shaw, Norwich, Jan. 22 to 28; Miss G. Gray, Toronto, Jan. 7 to 14, 20 to 23, and 27 to 30.

1	Norval, Orange Hall	Halton	January	7
2	Ballinafad, Temperance Hall	Halton	"	8
3	Freelton, McFarlane's Hall	North Wentworth	"	9
4	Waterdown, Township Hall	North Wentworth	"	10
5	Rockton, Township Hall	North Wentworth	"	11
6	St. George, Mechanic's Hall	North Brant	"	13
7	Onondaga, Township Hall	North Brant	"	14
8	Burford, Cornish Hall	South Brant	"	15
9	Mohawk, Meth. Church Basement	South Brant	"	16
10	Ancaster, Town Hall	South Wentworth	"	17
11	Stoney Creek, Institute Hall	South Wentworth	"	18
12	Campden, Fry's Hall	Lincoln	"	20
13	Queenston, School House	Lincoln	"	21
14	Allanbury, Town Hall	Welland	"	22
15	Ridgeway, Town Hall	Welland	"	23
16	Pelham Centre, Town Hall	Monck	"	24
17	Attercliffe Station, School House	Monck	"	25
18	Canfield, McDonald's Hall	Haldimand	"	27
19	Caledonia, Association Hall	Haldimand	"	28
20	Vittoria, Lecture Room	South Norfolk	"	29
21	Langton, Town Hall	South Norfolk	"	30

DIVISION 5. Geo. Carlaw, Warkworth, Ont., Jan. 8 to 30; A. Forster, Toronto, Jan. 13 to 18; C. W. Nash, Toronto, Jan 29 and 30; Miss M. Yates, Terrington Farm, Toronto, Jan. 8 to 15; Miss I. Rife, Hespeler, Jan. 17 and 18.

1	Eden Mills, Hall	South Wellington	January	8
2	Morriston, Town Hall	South Wellington	"	9
3	Wellesley, Town Hall	North Waterloo	"	10
4	Heidelburg, Steiss Hall	North Waterloo	"	11
5	Glen Allan, Hall	West Wellington	"	13
6	Moorefield, Township Hall	West Wellington	"	14
7	Drayton, Town Hall	West Wellington	"	15—16
8	Grand Valley	East Wellington	"	17
9	Colbeck	East Wellington	"	18
10	Chatsworth, Foresters' Hall (afternoon)	North Grey	"	20
11	Desboro, Township Hall (evening)	North Grey	"	20
12	Kilsyth, Township Hall	North Grey	"	21
13	Annan, Grange Hall (afternoon)	North Grey	"	22
14	Leith, Leith's Hall (evening)	North Grey	"	22
15	Kemble, School (afternoon)	North Grey	"	23
16	Brown's School House (evening)	North Grey	"	23
17	Owen Sound, Council Ch. (afternoon)	North Grey	"	24
18	Strathavon, Foresters' Hall	North Grey	"	25
19	Strathnairn, School House	North Grey	"	27
20	Meaford, Town Hall	North Grey	"	28
21	Newton Robinson, Orange Hall	South Simcoe	"	29
22	Thornton, Orange Hall	South Simcoe	"	30

DIVISION 6. W. C. Shearer, Bright, and Miss B. Maddock, Guelph.

1	Bethany, Church Basement	Centre Wellington	December	4
2	Metz, Orange Hall	Centre Wellington	"	5
3	Ospringe, School House	Centre Wellington	"	6

REGULAR MEETINGS.—*Continued.*

DIVISION 7. Dr. J. Standish, Walkerton, Nov. 29 to Dec. 17; Geo. Carlow, Warkworth, Nov. 29 to Dec. 17; Mrs. Colin Campbell, Windsor, Nov. 29, 30, Dec. 4 to 7; Dr. Annie Backus, Aylmer, Dec. 14; E. C. Drury, Crown Hill, Jan. 21 to 23.

1	Orangeville, Town Hall	Dufferin	November	29
2	Shelburne, Town Hall	Dufferin	"	30
3	Mono Mills, Town Hall	Peel	December	2
4	Streetsville, Oddfellows' Hall	Peel	"	3
5	Weston, Dufferin Hall	W. York	"	4
6	Woodbridge, Orange Hall	W. York	"	5
7	Aurora, Town Hall	N. York	"	6
8	New Market, Temperance Hall (afternoon)	N. York	"	7
9	Queensville, Soule's Hall (evening)	N. York	"	7
10	Agincourt, Temperance Hall	E. York	"	9
11	Stouffville, Council Chambers	E. York	"	10
12	Goodwood, Township Hall	N. Ontario	"	11
13	Sunderland, Township Hall	N. Ontario	"	12
14	Pontypool, Orange Hall (afternoon)	E. Durham	"	13
15	Bethany, Town Hall (evening)	E. Durham	"	13
16	Bailieboro, Lucas Hall (afternoon)	E. Durham	"	14
17	Millbrook, Town Hall (evening)	E. Durham	"	14
18	Kendal, Foresters' Hall (afternoon)	W. Durham	"	16
19	Orono, Town Hall (evening)	W. Durham	"	16
20	Bowmanville, Town Hall (afternoon)	W. Durham	"	17
21	Hampton, Town Hall (evening)	W. Durham	"	17
22	Columbus, Town Hall	S. Ontario	January	21
23	Greenbank, Temperance Hall	S. Ontario	"	22
24	Kinsale, Temperance Hall	S. Ontario	"	23

DIVISION 8. T. G. Raynor, Ottawa, Dec. 3 to 7; E. C. Drury, Crown Hill, Dec. 7 to 18; Dr. Annie Backus, Aylmer, Ont., Dec. 3 to 10, 16 to 18.

1	Oakwood, Town Hall	W. Victoria	December	3
2	Lindsay, Town Hall	W. Victoria	"	4
3	Fenelon Falls, Dickson's Hall	E. Victoria	"	5
4	Bobcaygeon, Town Hall	E. Victoria	"	6
5	Ennismore, Town Hall	W. Peterboro	"	7
6	Lakefield, Town Hall	W. Peterboro	"	9
7	Warsaw, Township Hall	E. Peterboro	"	10
8	Keene, Township Hall	E. Peterboro	"	11
9	Warkworth, Warkworth Hall	E. Northumberland	"	12
10	Codrington, Orange Hall	E. Northumberland	"	13
11	Menie, Lamb's Hall	E. Northumberland	"	14
12	Springbrook, Town Hall	N. Hastings	"	16
13	Madoc, Town Hall	N. Hastings	"	17
14	Tweed, Town Hall	E. Hastings	"	18

DIVISION 9. H. G. Reed, V.S., Georgetown, Dec. 4 to 20; Hy. Glendinning, Manilla, Dec. 4 to 18; Miss Blanche Maddock, Guelph, Dec. 17 and 18.

1	Emerald, Cheese Factory	Amherst Island	December	4
2	Stella, Town Hall	Amherst Island	"	5
3	Sunbury, Town Hall	Frontenac	"	6
4	Glenvale, Orange Hall	Frontenac	"	7
5	Odessa, Town Hall	Lennox	"	9
6	Napanee, Town Hall	Lennox	"	10
7	Newburgh, Finkle's Hall	Addington	"	11
8	Centreville, Town Hall	Addington	"	12
9	Deseronto, Town Hall	East Hastings	"	13
10	Wallbridge, Town Hall	West Hastings	"	17
11	Frankford, Curry's Hall	West Hastings	"	18
12	Grafton, Grafton Hall	West Northumberland	"	19
13	Harwood, Boyle's Hall	West Northumberland	"	20

REGULAR MEETINGS.—*Concluded.*

DIVISION 10. W. F. Kydd, Simcoe, Nov. 29 to Dec. 17; A. M. Campbell, Maxville, Nov. 29 to Dec. 7; A. E. Calnan, Allisonville, Ont., Dec. 9 to 17, Miss I. Rife, Hespeler, Dec. 6 and 7.

1	Middleville, Town Hall	North Lanark	November 29
2	Clayton, Public Hall	North Lanark	" 30
3	Smith's Falls, Town Hall	South Lanark	December 2
4	Perth, Town Hall	South Lanark	" 3
5	Merrickville, Town Hall	North Leeds	" 4
6	Oxford Mills, Town Hall	North Leeds	" 5
7	Inkerman	Dundas	" 6
8	Moorewood	Dundas	" 7
9	Spencerville, Town Hall	South Grenville	" 9
10	North Augusta	South Grenville	" 10
11	Caintown, Presbyterian Church Vestry	Brockville	" 11
12	Addison, Ashwoods	Brockville	" 12
13	Delta, Town Hall	South Leeds	" 13
14	Seeley's Bay, Knight's Hall	South Leeds	" 14
15	Fermoy, Town Hall	Centre Frontenac	" 16
16	Piccadilly, Town Hall	Centre Frontenac	" 17

DIVISION 11. J. N. Paget, Canboro, Dec. 2 to 20; W. J. Kerr, Ottawa, Dec. 2 to 16; A. H. Foster Twin Elm, Dec. 17 to 20; Miss I. Rife, Hespeler, Dec. 12 to 16, 19 and 20.

1	Berwick, Township Hall	Cornwall	December 2
2	Finch, Massey-Harris Hall	Cornwall	" 3
3	Avonmore, McCart's Hall	Stormont	" 4
4	Monkland, Gagnon's Hall	Stormont	" 5
5	Moose Creek	Stormont	" 6
6	North Lancaster	Glengarry	" 7
7	McCrimmon's, Public Hall	Glengarry	" 9
8	Vankleek Hill, Town Hall	Prescott	"10 & 11
9	Russell, Town Hall	Russell	" 12
10	Metcalfe, Town Hall	Russell	" 13
11	North Gower, Town Hall	Carleton	" 14
12	Richmond, Town Hall	Carleton	" 16
13	Renfrew, Temperance Hall	South Renfrew	" 17
14	Killaloe, School House	South Renfrew	" 18
15	Queen's Line, School House	North Renfrew	" 19
16	Beachburg, Town Hall	North Renfrew	" 20

DIVISION 12. W. S. Fraser, Bradford, Jan. 7 to 17; D. James, Langstaff, Jan. 7 to 17.

1	Gravenhurst, Town Hall (afternoon)	South Muskoka	January 7
2	Alport, School House (evening)	South Muskoka	" 7
3	Reay, School House (afternoon)	South Muskoka	" 8
4	Germania, School House (evening)	South Muskoka	" 8
5	Uffington, Crosier's Hall (afternoon)	South Muskoka	" 9
6	Purbrook, School House (evening)	South Muskoka	" 9
7	Baysville, Town Hall (afternoon)	South Muskoka	" 10
8	Bardsville, School House (afternoon)	South Muskoka	" 11
9	Macaulay, School House No. 2. (evening)	South Muskoka	" 11
10	Allansville, Hall	Centre Muskoka	" 13
11	Utterson, Town Hall	Centre Muskoka	" 14
12	Ufford, School House (afternoon)	Centre Muskoka	" 15
13	Raymond, Orange Hall (evening)	Centre Muskoka	" 15
14	Brackenrig, School House.	Port Carling	" 16
15	Port Carling, Town Hall	Port Carling	" 17

SUPPLEMENTARY MEETINGS.

Division 1. Gavin Barbour, Crosshill, Feb. 3 to 24; A. G. McKenzie, Fairview, Feb. 3 to 12; J. W. Widdifield, Uxbridge, Feb. 20 to 24: Miss I. Rife, Hespeler, Feb. 3 to 19.

1.	Fordwich, Foresters' Hall	East Huron	February 3
2.	Bluevale, Foresters' Hall	East Huron	" 4
3.	Jamestown, Victoria Hall	East Huron	" 5
4.	Molesworth, Orange Hall	East Huron	" 6
5.	Ethel, Township Hall	East Huron	" 7
6.	Walton, A.O.U.W. Hall	East Huron	" 8
7.	Harlock, School House	East Huron	" 10
8.	Winthrop, Scarlett's Hall	East Huron	" 11
9.	St. Columban, School House	East Huron	" 12
10.	Londesborough, Brown's Hall	West Huron	" 13
11.	Holmesville, Wilson's Hall	West Huron	" 14
12.	Benmiller, Foresters' Hall	West Huron	" 15
13.	St. Augustine, School	West Huron	" 17
14.	Dungannon, Elliott's	West Huron	" 18
15.	St. Helen's, Mechanics' Institute Hall	West Huron	" 19
16.	Bervie, I.O.O.F. Hall	Centre Bruce	" 20
17.	Glamis, Methodist Hall	Centre Bruce	" 21
18.	Paisley, Town Hall	Centre Bruce	" 22
19.	Gillies' Hill, Township Hall	Centre Bruce	" 24

Division 2. Jno. Campbell, Woodville, Jan. 7 to Feb. 7; C. Swale, Wiarton, Jan. 21 and 22; H. L. Beckett, Hamilton, Ont., Feb. 6 and 7; Miss B. Maddock, Guelph, Jan. 7 to 20; Miss Bertha Duncan, Emery, Jan. 23 to Feb. 6.

1.	Holland Centre, Town Hall	Centre Grey	January 7
2.	Walter's Falls, A.O.U.W. Hall	Centre Grey	" 8
3.	Temple Hill, Pres. Church Basement	Centre Grey	" 9
4.	Heathcote, Orange Hall	Centre Grey	" 10
5.	Kimberley, Union Hall	Centre Grey	" 11
6.	Flesherton, Town Hall	Centre Grey	" 13
7.	Priceville, Watson's Hall	Centre Grey	" 14
8.	Hopeville, Allan's Hall	Centre Grey	" 15
9.	Dundalk, Town Hall	Centre Grey	" 16
10.	Badjeros, Orange Hall	Centre Grey	" 17
11.	Maxwell, Orange Hall	Centre Grey	" 18
12.	Ravenna, Town Hall	Centre Grey	" 20
13.	Stayner, Stewart's Hall	West Simcoe	" 21
14.	New Lowell, Town Hall	West Simcoe	" 22
15.	Midhurst, Patron's Hall	Centre Simcoe	" 23
16.	Minesing, Workmen's Hall	Centre Simcoe	" 24
17.	Edenvale, Knox Hall	Centre Simcoe	" 25
18.	New Flos, School House	Centre Simcoe	" 27
19.	Phelpston, Murphy's Hall	Centre Simcoe	" 28
20.	Allanwood, Church Basement	Centre Simcoe	" 29
21.	Elmvale, Lance Hall	Centre Simcoe	" 30
22.	Wyevale, Orange Hall	Centre Simcoe	" 31
23.	Wyebridge, Orange Hall	Centre Simcoe	February 1
24.	LeFaivre's Corners, School House	Centre Simcoe	" 3
25.	Lefontaine, Foresters' Hall	Centre Simcoe	" 4
26.	Vasey, Orange Hall	Centre Simcoe	" 5
27.	Orillia, Council Chamber	East Simcoe	" 6 & 7

Division 3. W. S. Fraser, Bradford, Feb. 3 to 14; Anson Groh, Preston, Feb. 3 to 10; Hy. Glendinning, Manilla, Feb. 15 to 24; J. S. Pearce, London, Feb. 20 to 24; Miss S. Campbell, Brampton, Feb. 11 to 21.

1.	Lion's Head, Town Hall	North Bruce	February 3
2.	Spry's School House	North Bruce	" 4
3.	Mar, School House	North Bruce	" 5
4.	Allenford, Orange Hall	West Bruce	" 6
5.	Burgoyne, Church Vestry, (afternoon)	West Bruce	" 7
6.	McLennan's School House, (evening)	West Bruce	" 7
7.	Underwood, Town Hall	West Bruce	" 8
8.	Tiverton, Town Hall	West Bruce	" 10

SUPPLEMENTARY MEETINGS.—*Continued.*

9. Lucknow, Town Hall	South Bruce	February	11
10. Teeswater, Hall	South Bruce	"	12
11. Mildmay, Town Hall	South Bruce	"	13
12. Walkerton, Town Hall	South Bruce	"	14
13. Elmwood, Wildfang's Hall	South Grey and South Bruce	"	15
14. Ayton, Doersam's Hall	South Grey	"	17
15. Holstein, Agricultural Hall	South Grey	"	18
16. Dromore, Russell Hall	South Grey	"	19
17. Harriston, Town Hall	Union	"	20
18. Clifford, Town Hall	Union	"	21
19. Drew, Temperance Hall	Union	"	22
20. Teviotdale, Foresters' Hall	Union	"	24

DIVISION 4. W. F. Kydd, Simcoe, Feb. 4 to 15; R. J. Draper, Summerhill, Ont., Feb. 11 to 24; A. E. Sherrington, Walkerton, Feb. 17 to 24; Miss M. Yates, Toronto, Feb. 4 to 15.

1. Komoka, Masonic Hall	North Middlesex	February	4
2. Lobo, Masonic Hall	North Middlesex	"	5
3. Mooresville, Maccabees' Hall	North Middlesex	"	6
4. West McGillivray, Town Hall	North Middlesex	"	7
5 Greenway, Wilson's Hall	North Middlesex	"	8
6. Sylvan, Maccabees' Hall	North Middlesex	"	10
7. Arkona, Council Chamber	East Lambton	"	11
8. Forest, Town Hall	East Lambton	"	12
9. Uttoxeter, Orange Hall	East Lambton	"	13
10. Kingscourt, School House	East Lambton	"	14
11. Wyoming, Butler's Hall	East Lambton	"	15
12. Shetland, Peter's Hall	East Lambton	"	17
13. Oakdale, School House	West Lambton	"	18
14. Rutherford, Township Hall	West Lambton	"	19
15. Beecher, Forester's Hall	West Lambton	"	20
16. Wilkesport, Hamilton's Hall	West Lambton	"	21
17. Courtwright, Stewart's Hall	West Lambton	"	22
18. Sarnia, Town Hall, (afternoon)	West Lambton	"	24
19. Bunyan, School House, (evening)	West Lambton	"	24

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DIVISION 5. R. S. Stevenson, Ancaster, Feb. 3 to 15; A. G. McKenzie, Fairview, Ont., Feb. 1 to 22; W. S. Fraser, Bradford, Feb. 17 to 22; Miss B. Maddock, Guelph. Feb. 6, 10 to 14.

1 Gowanstown, Township Hall	North Perth	February	3
2 Carthage, Foresters' Hall	North Perth	"	4
3 Atwood, Hall	North Perth	"	5
4 Millbank, Ritter's Hall	North Perth	"	6
5 Monkton, Hall	North Perth	"	7
6 Rostock, Town Hall	North Perth	"	8
7 Tavistock, Public Hall	South Perth	"	10
8 Sebringville, Foresters' Hall	South Perth	"	11
9 Fullarton, Township Hall	South Perth	"	12
10 Staffa, Public Hall	South Perth	"	13
11 Kirkton, Aberdeen Hall	South Perth	"	14
12 Farquhar, Brenners' Hall	South Huron	"	15
13 Crediton, Township Hall	South Huron	"	17
14 Grand Bend, Public Hall	South Huron	"	18
15 Zurich, Township Hall	South Huron	"	19
16 Hensall, Willar's Hall	South Huron	"	20
17 Strong's Hall, Tuckersmith Tp	South Huron	"	21
18 Varna, Town Hall	South Huron	"	22

DIVISION 6. Speaker to be announced, Feb. 3 to 25; Geo. Carlaw, Warkworth, Feb. 3 to 25; Mrs. C. Campbell, Windsor, Feb. 3 to 11.

1 Princeton, Town Hall	North Oxford	February	3
2 Drumbo, Town Hall	North Oxford	"	4
3 Innerkip, Foresters' Hall	North Oxford	"	5
4 Cassell, Cheese Factory	North Oxford	"	6
5 Hickson, Foresters' Hall	North Oxford	"	7
6 Braemar, Gospel Hall	North Oxford	"	8

SUPPLEMENTARY MEETINGS.—*Continued.*

7	Embro, Town Hall	North Oxford	February	10
8	Thamesford, Foresters' Hall	North Oxford	"	11
9	Crampton, Town Hall	East Middlesex	"	12
10	Nilestown, Town Hall	East Middlesex	"	13
11	Wilton Grove, School House	East Middlesex	"	14
12	Lambeth, Foresters' Hall	East Middlesex	"	15
13	Hyde Park, Town Hall	East Middlesex	"	17
14	Ilderton, I.O.F. Hall	East Middlesex	"	18
15	Bryanston, I.O.F. Hall	East Middlesex	"	19
16	Wellburn, German's Hall	East Middlesex	"	20
17	Mt. Brydges, Town Hall	West Middlesex	"	21
18	Appin, Town Hall	West Middlesex	"	22
19	Wardsville, Town Hall	West Middlesex	"	24
20	Glencoe, Town Hall	West Middlesex	"	25

DIVISION 7. Anthony Forster, Toronto, Feb. 3 to March 4; A. McKenny, B.S.A., Essex, Ont., Feb. 18 to March 4; H. D. Kewley, Sarnia, Ont., Feb. 3 to 17; Miss L. Shuttleworth, Guelph, Feb. 7 to 15: Feb. 17, 21 and 22.

1	Straffordville, Town Hall	East Elgin	February	3
2	Mount Salem, Royal Templar's Hall	East Elgin	"	4
3	Sparta, Templar's Hall	East Elgin	"	5
4	Mapleton, School House	East Elgin	"	6
5	Middlemarch, Grange Hall	West Elgin	"	7
6	Dutton, Town Hall	West Elgin	"	8 & 10
7	Rodney, McCallum's Hall	West Elgin	"	11
8	Highgate, Township Hall	East Kent	"	12
9	Ridgetown, Township Hall (afternoon)	East Kent	"	13
10	Morpeth, A.O.U.W. Hall (evening)	East Kent	"	13
11	Blenheim, Township Hall	East Kent	"	14
12	Kent Bridge, R. B. Hall	East Kent	"	15
13	Thamesville, Town Hall	East Kent	"	17
14	Baldoon, Church	West Kent	"	18
15	Buxton, Foresters' Hall	West Kent	"	19
16	Valetta, Township Hall	West Kent	"	20
17	Wheatley, Gibson's Hall	West Kent and South Essex	"	21 & 22
18	Leamington, Town Hall	South Essex	"	24
19	Kingsville, Town Hall	South Essex	"	25
20	Harrow, Town Hall	South Essex	"	26
21	Amherstburg, Town Hall	South Essex	"	27
22	Sandwich, Town Hall	North Essex	"	28
23	Tecumseh, St. Jean's Hall (afternoon)	North Essex	"	29
24	Walkerville, School (evening)	North Essex	"	29
25	Elmstead, Hall	North Essex	March	2
26	St. Joachim, Hall (afternoon)	North Essex	"	3
27	Belle River, Town Hall (evening)	North Essex	"	3
28	Comber, Town Hall	North Essex	"	4

DIVISION 8. R. W. Wade, O.A.C., Guelph, Feb. 3 and 4; H. G. Reed, V.S., Georgetown, Feb. 5 to 15; J. N. Paget, Canboro, Feb. 17 to March 7; A. Leitch, B.S.A., Desoronto, Ont., Feb. 3 to 19; Louis A La Pierre, Paris, Ont., Feb. 20 to 28; Jas. Cornell, Scarboro, Ont., Feb. 29 to March 7; Miss B. Millar, Guelph, Feb. 10 to 19; Feb. 24 to March 7.

1	Ohsweken, Council House	South Brant	February	3
2	Burtch, School House	South Brant	"	4
3	Scotland, Foresters' Hall	South Brant	"	5
4	Hatchley, Baptist Church Basement	South Brant	"	6
5	Falkland, Hulbert Hall	South Brant	"	7
6	Catheart, Foresters' Hall	South Brant	"	8
7	York, Town Hall	Haldimand	"	10
8	Kohler, School House	Haldimand	"	11
9	South Cayuga, Hall	Haldimand	"	12
10	Selkirk, Town Hall	Haldimand	"	13
11	Sandusk, School House	Haldimand	"	14
12	Fisherville, Town Hall	Haldimand	"	15
13	Nelles' Corners, Hall	Haldimand	"	17
14	Clanbrassil, School House	Haldimand	"	18
15	Springvale, Hall	Haldimand	"	19

SUPPLEMENTARY MEETINGS.—*Continued.*

16	Port Dover, Town Hall	South Norfolk	February	20
17	St. Williams, Town Hall	South Norfolk	"	21
18	Fairground, Town Hall	South Norfolk	"	22
19	Maybee's School House	North Norfolk	"	24
20	Simcoe, Council Chamber	North Norfolk	"	25
21	Tyrrell, Tyrrell Hall	North Norfolk	"	26
22	Windham Centre, Town Hall	North Norfolk	"	27
23	Kelvin, Kelvin Hall	North Norfolk	"	28
24	Tillsonburg, Council Chambers	South Oxford	"	29
25	Brownsville, Town Hall	South Oxford	March	2
26	Springford, Town Hall	South Oxford	"	3
27	Burgessville, Oddfellows' Hall	South Oxford	"	4
28	Vandecar, Methodist Church	South Oxford	"	5
29	Beachville, Town Hall	South Oxford	"	6
30	Folden's, Folden's Hall	South Oxford	"	7

DIVISION 9. W. C. Shearer, Bright, Ont., Feb. 3 to 7; H. S. Peart, B.S.A., Jordan Harbor, Ont., Feb. 8 to 15; F. M. Lewis, Burford, Feb. 11 to March 3; J. D. Fraser, Leamington, Feb. 3 to 10; H. G. Reed, V.S., Georgetown, Ont., Feb. 17 to March 3; Dr. Annie Backus, Aylmer, Feb. 11 to 13; Feb. 17 to 22; Feb. 28 to March 3.

1	Jerseyville, Waite's Hall	South Wentworth	February	3
2	Carluke, School House	South Wentworth	"	4
3	Glanford, Town Hall	South Wentworth	"	5
4	Hannon, Hall	South Wentworth	"	6
5	Binbrook, Town Hall	South Wentworth	"	7
6	Tapleytown, Old Church	South Wentworth	"	8
7	Winona, Institute Hall	South Wentworth	"	10
8	Grimsby, Society Hall	Lincoln	"	11
9	Beamsville, Town Hall	Lincoln	"	12
10	Jordan, McIvor's	Lincoln	"	13
11	Grantham, Orange Hall	Lincoln	"	14
12	Virgil, Public Hall	Lincoln	"	15
13	Niagara Falls South, Town Hall	Welland	"	17
14	Willoughby, Town Hall	Welland	"	18
15	Crowland, Town Hall	Welland	"	19
16	Welland, Court House (afternoon)	Welland	"	20
17	Air Line Junction, School House (evening)	Welland	"	20
18	Stevensville, Johnson's Hall (afternoon)	Welland	"	21
19	Brown Road, School House (evening)	Welland	"	21
20	Humberstone, Town Hall	Welland	"	22
21	Dunnville, Town Hall	Monck	"	24
22	Marshville, Town Hall	Monck	"	25
23	Wellandport, Misener's Hall	Monck	"	26
24	Smithville, Brant's Hall	Monck	"	27
25	Orkney, Township Hall (afternoon)	North Wentworth	"	28
26	Lynden, Thompson's Hall (evening)	North Wentworth	"	28
27	Sheffield, Township Hall (afternoon)	North Wentworth	"	29
28	Westover, Maccabee's Hall (evening)	North Wentworth	"	29
29	Carlisle, Orange Hall	North Wentworth	March	2
30	Millgrove, Township Hall	North Wentworth	"	3

DIVISION 10. E. C. Drury, B.S.A., Crown Hill, Ont., Feb. 3 to 29; R. R. Elliott, Owen Sound, Feb. 26 to 29; Miss I. Rife, Hespeler, Feb. 3 to 11.

1	Linwood, Spahr's Hall	North Waterloo	February	3
2	Crosshill, Township Hall	North Waterloo	"	4
3	Hawkesville, Fowell's Hall	North Waterloo	"	5
4	Floradale, Steddrick's Hall	North Waterloo	"	6
5	Elmira, E. M. S. Hall	North Waterloo	"	7
6	Conestogo, Township Hall	North Waterloo	"	8
7	St. Jacob's, Wideman's Hall	North Waterloo	"	10
8	Waterloo, Town Hall	North Waterloo	"	11
9	Galt, Town Hall	South Waterloo	"	12
10	Breslau, Old Church	South Waterloo	"	13
11	New Hamburg, Fell Hall	South Waterloo	"	14
12	Hespeler, Temperance Hall	South Waterloo	"	15
13	Ayr, McGeorge's Hall	South Waterloo	"	17

SUPPLEMENTARY MEETINGS.—*Continued.*

14	Roseville, Hall	South Waterloo	February	18
15	New Dundee, Hall	South Waterloo	"	19
16	Mannheim, Hall	South Waterloo	"	20
17	Haysville, Village Hall	South Waterloo	"	21
18	Philipsburg, Hall	South Waterloo	"	22
19	Branchton, Foresters' Hall	South Waterloo	"	24
20	Preston, Council Room	South Waterloo	"	25
21	Glenmorris, Hall (afternoon)	North Brant	"	26
22	Mau's, School House (evening)	North Brant	"	26
23	Moyle's, School House (afternoon)	North Brant	"	27
24	White's, School House (evening)	North Brant	"	27
25	Cainsville, Orange Hall	North Brant	"	28
26	Langford, School House (afternoon)	North Brant	"	29
27	Mulligan's, School House (evening)	North Brant	"	29

DIVISION 11. T. H. Race, Mitchell, Ont., Feb. 3 to March 5; J. C. Shaw, Norwich, Ont., Feb. 3 to March 5; Miss G. Carter, Guelph, Feb. 10 to 18, 22, and 24.

1	Arthur, Town Hall	East Wellington	February	3
2	Damascus, Township Hall	East Wellington	"	4
3	Kenilworth, Township Hall	East Wellington	"	5
4	Mt. Forest, Allan's Hall	East Wellington	"	6
5	Conn, Orange Hall (afternoon)	East Wellington	"	7
6	Conn, School House (evening)	East Wellington	"	7
7	Cedarville, Orange Hall	East Wellington	"	8
8	Palmerston, Town Hall	West Wellington	"	10
9	Rothesay, Temperance Hall	West Wellington	"	11
10	Alma, Town Hall	West Wellington	"	12
11	Ennottville, Mechanics' Hall	Centre Wellington	"	13
12	Belwood, Town Hall	Centre Wellington	"	14
13	Orton, Town Hall	Centre Wellington	"	15
14	Hillsburg, School House	Centre Wellington	"	17
15	Marsville	Centre Wellington	"	18
16	Adjala, Sloan's Hall	South Simcoe	"	19
17	Bond Head, Orange Hall	South Simcoe	"	20
18	Cookstown, Orange Hall	South Simcoe	"	21
19	Elm Grove, Orange Hall	South Simcoe	"	22
20	Stroud, Orange Hall	South Simcoe	"	24
21	Churchill, Orange Hall	South Simcoe	"	25
22	Creemore, Leonard's Hall	West Simcoe	"	26
23	Duntroon, S.O.S	West Simcoe	"	27
24	Singhampton, Grant's Hall	West Simcoe	"	28
25	Nottawa, Orange Hall West	West Simcoe	"	29
26	Oro Station, School House	East Simcoe	March	2
27	Edgar, Temperance Hall	East Simcoe	"	3
28	Price's Corners, Temperance Hall	East Simcoe	"	4
29	Moonstone, Robinson's Hall	East Simcoe	"	5

DIVISION 12. H. Glendinning, Manilla, Jan. 7 to Feb. 10; C. Swale, Wiarton, Jan. 7 to 15; R. Ness, Howick, P.Q., Jan. 25 to Feb. 10; Miss M. Yates, Toronto, Jan. 16 to 24; Dr. A. Backus, Aylmer, Feb. 6 to 10.

1	Keldon, Church Hall (afternoon)	Dufferin	January	7
2	Jessopville, Church Hall (evening)	Dufferin	"	7
3	Riverview, School House (afternoon)	Dufferin	"	8
4	Corbetton, Church Hall (evening)	Dufferin	"	8
5	Honeywood, C. F. Hall	Dufferin	"	9
6	Horning's Mills, Workmen's Hall	Dufferin	"	10
7	Perm, Orange Hall	Dufferin	"	11
8	Relessey, Orange Hall	Dufferin	"	13
9	Glen Cross, Jeffer's Hall (afternoon)	Dufferin	"	14
10	Camilla, Harshaw's Hall (evening)	Dufferin	"	14
11	Laurel, Township Hall	Dufferin	"	15
12	Huttonville, Wart's Hall	Peel	"	16
13	Cheltenham, Harris Hall	Peel	"	17
14	Alton, Science Hall	Peel	"	18
15	Caledon, Township Hall	Peel	"	20
16	Bolton, Town Hall	Peel	"	21

SUPPLEMENTARY MEETINGS.—*Continued.*

17	Mono Road, Society Hall	Peel	January	22
18	Tullamore, Town Hall	Peel	"	23
19	Malton, Temperance Hall	Peel	"	24
20	Kleinburg, Temperance Hall	West York	"	25
21	Maple, Masonic Hall	West York	"	27
22	Elia, Foresters' Hall	West York	"	28
23	Thistletown, Hotel	West York	"	29
24	Islington, Township Hall	West York	"	30
25	Thornhill, Victoria Hall	East York	"	31
26	Wexford, Methodist Church	East York	February	1
27	Box Grove, Foresters' Hall	East York	"	3
28	Victoria Square, Public Hall	East York	"	4
29	Nobleton, Music Hall (afternoon)	North York	"	5
30	King Creek, Crossley's Hall (evening)	North York	"	5
31	Schomberg, Temperance Hall (afternoon)	North York	"	6
32	Kettleby, Temperance Hall (evening)	North York	"	6
33	Vandorf, Mechanic Hall (afternoon)	North York	"	7
34	Ballantrae, Village Hall (evening)	North York	"	7
35	Mt. Albert, Town Hall	North York	"	8
36	Belhaven, Village Hall (afternoon)	North York	"	10
37	Sutton West, Village Hall (evening)	North York	"	10

DIVISION 13. H. G. Reed, Georgetown, Jan. 7 to Feb. 3; A. G. McKenzie, Fairview, Ont., Jan. 7 to 16; J. L. Warren, Acton, Jan. 17 to Feb. 3.

1	Altona, School House	North Ontario	January	7
2	Uxbridge, Town Hall	North Ontario	"	8
3	Sanford, Village Hall	North Ontario	"	9
4	Zephyr, Public Hall	North Ontario	"	10
5	Udora, Orange Hall	North Ontario	"	11
6	Cannington, Village Hall	North Ontario	"	13
7	Beaverton, Alexander's Hall	North Ontario	"	14
8	Brechin, McGrath's Hall	North Ontario	"	15
9	Udney, Orange Hall	North Ontario	"	16
10	Woodville, Village Hall	West Victoria	"	17
11	Little Britain, Temperance Hall	West Victoria	"	18
12	Valentia, Temperance Hall	West Victoria	"	20
13	Dunsford, Old Church	East Victoria	"	21
14	Cameron, Orange Hall	East Victoria	"	22
15	Burnt River, Orange Hall	East Victoria	"	23
16	Omemee, Opera House	East Victoria	"	24
17	Bethany, Town Hall (afternoon)	East Durham	"	25
18	Manvers' Station (evening)	East Durham	"	25
19	Millbrook, Town Hall (afternoon)	East Durham	"	27
20	Cavanville, Old Church (evening)	East Durham	"	27
21	Garden Hill, Orange Hall	East Durham	"	28
22	Canton, Sons of England Hall	East Durham	"	29
23	Newtonville, Sons of Temperance Hall (aft.)	West Durham	"	30
24	Newcastle, Town Hall (evening)	West Durham	"	30
25	Orono, Town Hall	West Durham	"	31
26	Solina, Temperance Hall	West Durham	February	1
27	Nestleton, Foresters' Hall	West Durham	"	3

DIVISION 14. J. N. Paget, Canboro, Jan. 10 to 21; Jas. Cornell, Scarboro, Jan. 10 to 22; A. Hume, Menie, Feb. 4 to 7; H. Jones, Maitland, Jan. 23 to Feb. 7; Miss I. Rife, Hespeler, Jan. 20 to 29.

1	Lakehurst, Town Hall (afternoon)	West Peterboro	January	10
2	Hall's Bridge, School House (evening)	West Peterboro	"	10
3	Selwyn, Temperance Hall	West Peterboro	"	11
4	Peterboro, Council Chambers (afternoon)	West Peterboro	"	13
5	North Monaghan, Town Hall (evening)	West Peterboro	"	13
6	4th Line Smith, Orange Hall	West Peterboro	"	14
7	Stewarts, Union Hall	West Peterboro	"	15
8	Havelock, Town Hall	East Peterboro	"	16
9	Norwood, Town Hall	East Peterboro	"	17
10	Westwood, Township Hall	East Peterboro	"	18
11	Hillier, Town Hall (afternoon)	Prince Edward	"	20

SUPPLEMENTARY MEETINGS.—*Continued.*

12	Wellington, Town Hall (evening)	Prince Edward	January	20
13	West Lake, School House (afternoon)	Prince Edward	"	21
14	Picton, Shire Hall (evening)	Prince Edward	"	21
15	Demorestville, Town Hall	Prince Edward	"	22
16	Milford, Town Hall	Prince Edward	"	23
17	Cressy, Town Hall (afternoon)	Prince Edward	"	24
18	Waupoos, Town Hall (evening)	Prince Edward	"	24
19	Wooler, Town Hall	East Northumberland	"	25
20	Brighton, Town Hall	East Northumberland	"	27
21	Colborne, Temperance Hall	East Northumberland	"	28
22	Castleton, Town Hall	East Northumberland	"	29
23	Roseneath, Township Hall	West Northumberland	"	30
24	Baltimore, Chapman's Hall	West Northumberland	"	31
25	Myrtle	South Ontario	February	4
26	Pickering, Fire Hall	South Ontario	"	5
27	Whitby, Council Chamber	South Ontario	"	6
28	Coldsprings, Township Hall	West Northumberland	"	7

DIVISION 15. A. C. Hallman, Breslau, Jan. 10 to Feb. 12; J. H. Esdon, Bainsville, Jan. 10 to 25; J. W. Widdifield, Uxbridge, Jan. 27 to Feb. 12; Miss B. Maddock, Guelph, Jan. 24 to 29; Feb. 1 and 3.

1	Adolphustown, Town Hall	Lennox	January	10
2	Sillsville, Town Hall	Lennox	"	11
3	Wilton, Grange Hall	Lennox	"	13
4	Enterprise, Merrill's	Addington	"	14
5	Tamworth, Town Hall	Addington	"	15
6	Bogart, School House	East Hastings	"	16
7	Queensboro, Orange Hall	North Hastings	"	17
8	Eldorado, Town Hall	North Hastings	"	18
6	Marmora, Town Hall	North Hastings	"	20
10	Ivanhoe, Orange Hall	North Hastings	"	21
11	Moira, Town Hall	North Hastings	"	22
12	Stirling, Foresters' Hall	North Hastings	"	23
13	Turner's School House	West Hastings	"	24
14	Gilbert's School House	West Hastings	"	25
15	Johnstown, School House	West Hastings	"	27
16	Bayside, School House	West Hastings	"	28
17	Foxboro, Friend's Hall	East Hastings	"	29
18	Plainfield, Orange Hall	East Hastings	"	30
19	Thomasburg, C.O.O.F. Hall	East Hastings	"	31
20	Melrose, Town Hall	East Hastings	February	1
21	Clazie's School House	East Hastings	"	3
22	Wolfe Island, Town Hall	Frontenac	"	4
23	Joyceville, Joyce's Hall	Frontenac	"	5
24	Glenburnie, Orange Hall	Frontenac	"	6
25	Sydenham, Township Hall	Frontenac	"	7
26	Parham, I.O.O.F. Hall	Centre Frontenac	"	8
27	Mt. Grove, Town Hall	Centre Frontenac	"	10
28	Newboro, Town Hall	Leeds	"	11
29	Lansdowne, Town Hall	Leeds	"	12

DIVISION 16. F. M. Lewis, Burford, Jan. 10 to Feb. 8; A. Leitch, Deseronto, Ont., Jan. 10 to 18; G. H. Barr, Ottawa, Jan. 20, 21 and 24; A. M. Campbell, Maxville, Jan. 25 to Feb. 8.

1.	Mallorytown, Odd-Fellows' Hall	Brockville	January.	10
2.	Lyn, School House	Brockville	"	11
3.	New Dublin, Township Hall	Brockville	"	13
4.	Maitland, Workmen's Hall	South Grenville	"	14
5.	Lord's Mills, Orange Hall (afternoon)	South Grenville	"	15
6.	Maynard, Church Basement (evening)	South Grenville	"	15
7.	Roebuck, School House	South Grenville	"	16
8.	Ventnor, School House	South Grenville	"	17
9.	Shanley, Workmen's Hall (afternoon)	South Grenville	"	18
10.	Brouseville, School House (evening)	South Grenville	"	18
11.	Brinston's Corners, Gibson's Hall	Dundas	"	20
12.	North Williamsburg, Boyce's Hall	Dundas	"	21

SUPPLEMENTARY MEETINGS.—*Concluded.*

13. Winchester Springs	Dundas	January	24
14. Aultsville, Public Hall	Stormont	"	25
15. Osnabruck Centre, Township Hall	Stormont	"	27
16. Newington, Stormont Hall	Stormont	"	28
17. Northfield, Arbuthnot's Hall	Cornwall	"	29
18. Cornwall Centre, Township Hall	Cornwall	"	30
19. South Branch, Patron's Hall	Cornwall	"	31
20. Martintown, St. Andrew's Hall	Glengarry	February	1
21. Greenfield, Township Hall	Glengarry	"	3
22. St. Ann de Prescott, Leframbois	Prescott	"	4
23. Alfred, Town Hall	Prescott	"	5
24. Clarence Creek, Town Hall	Russell	"	6
25. Casselman, Town Hall	Russell	"	7
26. Vars, Ganley's Hall	Russell	"	8

DIVISION 17. T. H. Mason, Straffordville, Jan. 10 to Feb. 8; H. C. Emerson, Corbyville, Jan. 10 to 20; W. F. Stephen, Huntingdon, P.Q., Jan. 21 to Feb. 8.

1. Toledo, Town Hall	North Leeds and Grenville	January	10
2. Easton's Corners, Methodist Church	North Leeds and Grenville	"	11
3. Bishop's Mills, Temperance Hall	North Leeds and Grenville	"	13
4. Heckston, School House	North Leeds and Grenville	"	14
5. Burritt's Rapids, Victoria Hall	North Leeds and Grenville	"	15
6. McLean's School House	South Lanark	"	16
7. Drummond, Town Hall	South Lanark	"	17
8. Harper, Town Hall	South Lanark	"	18
9. Maberley, Town Hall	South Lanark	"	20
10. Elphin, Public Hall	North Lanark	"	21
11. McDonald's Corners, Agricultural Hall	North Lanark	"	24
12. Watson's Corners, Temperance Hall	North Lanark	"	25
13. Lanark, Town Hall	North Lanark	"	27
14. Stittsville, Harton's Hall	Carleton	"	28
15. Bell's Corners, Orange Hall	Carleton	"	29
16. South March, Town Hall	Carleton	"	30
17. Carp, Town Hall	Carleton	"	31
18. Fitzroy's Harbor, Town Hall	Carleton	February	1
19. Glasgow, Davis Hall	South Renfrew	"	3
20. Horton, Town Hall	South Renfrew	"	4
21. Admaston, Temperance Hall	South Renfrew	"	5
22. Gratton, School House	South Renfrew	"	6
23. Scotland, School House	North Renfrew	"	7
24. Micksburg, Orange Hall	North Renfrew	"	8

SPEAKERS AND SUBJECTS.

ANDERSON, DUNCAN C., Orillia.—Mr. Anderson, a native Scotchman, came to this country at an early age, and afterwards settled on a bush farm in Simcoe County, which he cleared with his own hands, and by dint of hard labor and well thought out plans, has succeeded in putting it into first-class condition. Mr. Anderson has paid special attention to the production of beef cattle and bacon hogs, and is an authority in the selection of heavy horses. He is a first-class judge of the classes of stock indicated in his list of subjects. Not only has he done regular Institute work in this Province for a number of years, but has been one of the Institute speakers sent out by the Dominion Department of Agriculture to do work in other Provinces, having visited all sections of the Dominion in which Institute work has been regularly done.

SUBJECTS: "Soil Cultivation and Rotation of Crops," "Clover as a Fertilizer," "Manure, its Care and Application," "Cattle Raising," "The Breeding of Heavy Horses," "Hog Breeding and Feeding." Evening: "Farming as an occupation."

BARBOUR, GAVIN, Crosshill.—Mr. Barbour has now had three years' experience as an Institute worker, and his services should prove of great benefit to the districts in which the production of beef and the cultivation of the soil are of importance. Mr. Barbour is a representative of a large number of farmers who have succeeded by hard labour and a thorough knowledge of the lines of farming followed, in increasing the productivity of the farm and making many improvements, while at the same time paying off obligations. The young farmers especially should benefit from Mr. Barbour's addresses.

SUBJECTS: "The Beefsteak Steer," "Draft Horses and How to Raise Them," "Corn Growing," "Cultivation and Manures," "Farmers and Their Sons."

BARR, G. H., Dairy Division, Dominion Department of Agriculture, Ottawa.—Mr. Barr was for some years secretary of the Western Dairymen's Association, and Chief Dairy Instructor for Western Ontario. His wide experience in dairy matters, and his close connection with farming in general makes him a valued Institute worker, especially in those districts where dairying is a prominent feature of the agricultural work.

SUBJECTS: "Sanitation on the Farm, and in the Factory," "Dairy Markets," "The Relation of the Patron and the Manufacturer."

BECKETT, H. L., Hamilton.—Mr. Beckett is the son of a prosperous farmer in the vicinity of Hamilton. He spent his early years on the farm, and subsequently took a full course at the Ontario Agricultural College, graduating in 1893. Mr. Beckett has successfully managed the homestead, devoting a good deal of attention to the dairy industry. He had charge of one of the travelling dairies which toured the Province some years ago, and gave general satisfaction in conducting this educational campaign. He has already had extended experience in Institute work, and is quite at home in it. Mr. Beckett will be available for occasional meetings this winter.

SUBJECTS: "Farmyard Manure; its Management and Application," "Improving our Dairy Herds," "Feeding for Milk." Evening: "Farming as an Occupation."

Bonis, David, St. Mary's.—Mr. Bonis is one of the successful farmers of Perth County, and has taken an active part in the improvement of roads. He has paid special attention to the production of beef cattle, and his experience in these two lines as well as in the many duties which accompany the successful management of a general farm, places him in a position to be of value as an Institute worker.

Subjects: "Selection and Feeding of Beef Cattle," "Our Country Roads, and How to Improve them," "Present Day Improvements in Agriculture."

Beausoliel, Adolph, Tecumseh.—Mr. Beausoliel is one of the successful farmers of Essex, and is thoroughly competent to give instruction in dairying and general cultivation of the soil. Mr. Beausoliel delivers his addresses in French.

Subjects: "Care and Feeding of Dairy Cattle," "Butter Making on the Farm."

Calnan, A. E., Allisonville.—Mr. Calnan is a practical farmer of Prince Edward County, and has had 15 years' experience along the line of cheese factory work, having been President, Vice-President and Secretary-Treasurer of one of the leading factories in Prince Edward County, which has become so famous for its high quality of cheese. It will be seen from Mr. Calnan's subjects that he is prepared to talk upon general farming, and his wide experience and success render him a valuable delegate in the discussions.

Subjects: "The Building-up and Maintenance of the Dairy Herd," "The Raising of Fodder for Dairy Cattle," "Co-operative Cheese Making from the Producers' and Manufacturers' Standpoints." Evening: "The Relation which should Exist between Milk Producers and Cheese Manufacturers," "The Improvement of Crops by Seed Selection and the Part which the Boy can take Therein."

Campbell, A. M., Maxville.—Mr. Campbell is one of the successful dairymen of Eastern Ontario and his practical experience and ability to give information in a clear and forceful manner render his a valuable acquisition to the Institute staff.

Subjects: "Care and Feeding of the Dairy Cow," "The Breeding of dairy Cattle," "Cultivation of Corn, and the Silo." "The Bright Side of Farm Life."

Campbell, Jno., Woodville.—It is not necessary to more than mention that the John Campbell referred to is the well known sheep breeder who has been so successful, not only at Exhibitions in Canada, but also at the leading shows on the other side of the line. Mr. Campbell's specialty is sheep raising, and we also consider him one of the best authorities on general farming, and the production of beef.

Subjects: "Growing Lambs for Profit," "The Butcher's Bullock, from Breeding to Block," "The Bacon Trade," "Importance of Using good Selections of Seed Grain," "How to Double the Production and Income of the Average Farm," "Tile Draining," Evening: "Ontario—Our Duty in Maintaining its Reputation," "Farming as a Business."

Carlaw, Geo., Warkworth.—Mr. Carlaw is a good, practical farmer in Northumberland County. He attended the Ontario Agricultural College in his earlier years, and since then has been putting into practice on his farm the knowledge acquired in that Institution. He is a practical dairyman, having served his time in the home dairy, and in the factory. Mr. Carlaw is also familiar with the practical work of the Farmers' Institute, having been secretary of his own local institute for many years. Mr. Carlaw has had several years experience in Ontario Institutes, both as lecturer and officer, and has done similar work in Quebec.

Subjects: "Selection and Feeding of the Dairy Herd," "Eradication of Weeds," "Corn Growing for the Silo," "The Farm Dairy." Evening: "Agricultural Education," "Cultivation of the Soil."

Caston, G. C., Craighurst.—Mr. Caston is past president of the Ontario Fruit Growers' Association and has charge of the Fruit Experiment station in Simcoe County. He is one of the oldest Institute workers, and is well and favorably known in this capacity throughout the Province. In addition to the subjects bearing directly on fruit, Mr. Caston is prepared to discuss cold storage, transportation, and marketing of products. He has probably done as much as any other man to introduce hardy fruits suitable to our northern districts.

Subjects: "Succulent Foods and Fodder Crops," "Soil Problems and Nitrogen Traps," "The Export Bacon Trade," "Orchard Fruits of Ontario: their Care and Culture," "Some of our Troublesome Weeds," (illustrated). Evening: "Picking, Packing and Shipping Fruit," "The Fruit Garden," "The Land we Live in."

Clark, J. G., Ottawa.—Mr. Clark has for many years been a prominent farmer in the vicinity of Ottawa, and has given special attention to the production of milk for city trade. The dairyman who can successfully produce milk for this trade is in a position to give sound and valuable advice to the patrons of cheese factory and creamery as to methods of care and handling. Mr. Clark is also a recognized authority on heavy horses, and was engaged by the Provincial Department to assist in taking a census of the horse industry of the Province.

Subjects: "Breeding and Management of Heavy Horses," "The Judging of Dairy Cattle," "The Production and Handling of Milk," "The Cultivation of Roots and Ensilage." Evening: "Country versus City Life," "Our Heritage as Canadians."

Clark, J. W., Cainsville.—Mr. Clark is one of the largest breeders and feeders of poultry in the Province. He is a strong advocate of utility breeds for the farmer and approves of fattening chickens in crates. That he knows how to select the proper type for the best results is shown by the large number of prizes he has won on dressed poultry at the Winter Fair, Guelph. These prizes include the sweepstakes for the best pair in show. Mr. Clark is also a breeder of pure-bred hogs of the bacon type, has had several years' experience in growing alfalfa, and has also a large apiary. Mr. Clark has given considerable attention to the production of good seed and methods of identification and eradication of weeds.

Subjects: "The Importance of Seed Selection," "Noxious Weeds and Best Methods of Eradication," "Growing Alfalfa," "Feeding Hogs, Bacon Type vs. Short Fat," "Manure; Its Care and Application," "Improvement

of our Public Roads." Evening: "Poultry; Selecting, Breeding, Hatching, Rearing, Fattening," "Farmers' Poultry Houses and Fixtures," "The Incubator; Eggs in Winter," "Care of the Honey Bee."

CORNELL, J. G., Scarboro.—Mr. Cornell has had the advantage of instruction at the Agricultural College, Guelph, as well as a number of years' practical experience in successfully managing his own farm, which has been devoted largely to the production of milk.

SUBJECTS: "Production of Milk for City Trade," "The Growing of Grain for Silage Purposes," "Cultivation and Rotation," "Co-operation for the Farmer."

DRAPER, R. J., Summerhill.—Mr. Draper is a practical farmer who has taken a deep interest in local Institute work. His practical knowledge is based upon years of experience and observation, and he has had sufficient experience in public speaking to render him capable of imparting his information in a forceful, pleasing and convincing manner.

SUBJECTS: "How to Increase the Production of the Average Farm," "Corn and Clover," "Destruction of Weeds."

DRURY, E. C., Crown Hill.—Mr. Drury is an honor graduate of the O. A. C. and works successfully 150 acres, the farm upon which his father and grandfather lived. He is a fluent, forcible and convincing speaker, and is well prepared to discuss the subjects for which he is announced. Mr. Drury is a good judge of live stock, and a recognized authority on soil cultivation.

SUBJECTS: "Rotation of Crops, Including Cultivation," "Weeds, and How to Combat them," "Soil Moisture and Its Control," "The Farmer's Flock of Sheep," "The Breeding and Feeding of Beef Animals," "The Dual Purpose Cow." Evening: "The Social Side of Farming."

DUKE, J. O., Ruthven.—Mr. Duke is a successful farmer in Kent County, and has given special attention to corn breeding, and seed selection. His addresses being founded on practical experience will prove of much value to those who hear them.

SUBJECTS: "Corn Growing," "The Peach Industry," "Improvement of Seed," "Education for Farmers' Boys and Girls."

ECHLIN, J. H., Balderson.—Mr. Echlin has had extended experience in dairying so far as the making side of the problem is concerned. He has been one of the regular dairy syndicate instructors during the summer season, for several years, and has also been one of the Dairy School Instructors at Kingston. From his wide experience in inspecting factories as well as the farms of the patrons, Mr. Echlin's services should prove most valuable in the Dairy sections which he may visit.

SUBJECTS: "Sanitary Requirements of Cheese Factories," "Care of Milk for Cheese Factories," "Some of the Chief Requirements to Perfect the Cheese Products," "Duties of Patrons, Proprietors and Manufacturers."

ELLIOTT, ANDREW, Galt.—Mr. Elliott was born near Galt and has been a most successful breeder of dairy cattle and bacon hogs for many years. He has retired from the management of his farm, his son William succeeding him in this. Mr. Elliott has been sought after by several States of the Union for Institute work, with the result that he has devoted very little time to the Ontario Institutes for several seasons. Mr. Elliott is one of our oldest Insti-

tute workers, and is enthusiastic, persevering, and extremely anxious for the success of every meeting he attends. His long experience as a successful farmer, and his ability to tell in an instructive and forcible manner just what he has accomplished, as well as the conclusions of others as to the most approved methods, renders him a valuable worker.

SUBJECTS: "Moisture and Fertility of the Soil," "The Benefits of Clover," "Clover Hay," "Roots Necessary to the Successful Handling of Live Stock," "Corn and Silage," "The Profits of Sheep," "The Modern Hog," "Breeding, Feeding and Caring for the Dairy Cow," "Principles of Stock Breeding," "Pure Seeds," "Concrete." Evening: "Our Duty."

ELLIOTT, R. R., Owen Sound.—Mr. Elliott took a two years' course at the Agricultural College, and spent some years as herdsman at the Dominion Experimental Farm. Mr. Elliott is now operating a farm of his own. His work in the service of the Dominion Department of Agriculture, and his practical experience upon his own farm renders him a valuable acquisition to the Institute staff.

SUBJECTS: "Present Day Dairying," "Bacon Industry," "Beef Cattle," "Stable Management, and the Common Ailments of Cattle," "Improving and Beautifying Home Surroundings."

ELLIOTT, WM., Galt.—Mr. William Elliott is the son of Andrew Elliott. He attended the O.A.C., Guelph, and since graduation has been putting into practice the knowledge there gained. He has followed in his father's steps as a breeder of dairy cattle and bacon hogs, and has been a conspicuous prize winner at our large fairs. He is thoroughly practical and up-to-date in his methods of farming.

SUBJECTS: "The Cultivation of Our Farms," "The Care and Breeding of Dairy Cows," "The Bacon Hog, Breeding and Feeding." Evening: "Things We Ought to Think About."

EMERSON, H. C., Corbyville.—Mr. Emerson has had experience as secretary of his local Institute, and has also done more or less Institute work as a regular delegate in different sections of the Province. He has succeeded in enriching the soil of his own farm and destroying the weeds thereon, and has still had profitable use of his land each season. His cows this season, 1907, have averaged six thousand pounds during the cheese factory period.

SUBJECTS: "Judging and Breeding the Dairy Cow," "Selecting and Care of the Brood Sow and Young Pigs," "A Practical Talk on Corn." Evening: "The Land We Live In."

ESDON, JAS. H., Bainsville.—Mr. Esdon has been for many years farming in Glengarry County, a county noted for its many dairy farms. He should prove a practical speaker, and can discuss from experience the subjects for which he is announced.

SUBJECTS: "Heavy Horses, their Breeding and Care," "Treatment of the Dairy Cow," "Swine Breeding and Dairy Production," "Poultry for Profit."

FORSTER, ANTHONY, Toronto.—Mr. Forster is a practical farmer who took an active part in establishing the well-known Locust Hill Creamery some years since. He is an authority upon dairy matters in general, and has also given special attention to the production of pure seed. He has had some experience in Institute work.

SUBJECTS: "Weeds and Seed Improvement," "Rotation of Crops," "Building Up the Dairy Herd," "Social Life on the Farm."

FOSTER, J. G., Myrtle Station.—Mr. Foster is a practical farmer, and makes a specialty of dairying. Mr. Foster was secretary of North Hastings Farmers' Institute for several years. His success in this office renders his services of special benefit to Institute officers in their local work.

SUBJECTS: "Crop Rotation," "The Bacon Hog," "The Dairy Cow," "Our Fodder Crops." Evening: "The Land We Live In."

FRASER, J. D. Leamington.—Mr. Fraser has had large experience in fruit-growing and general farming. He can be called an expert in fruit and early vegetable growing, especially tomatoes and melons, which he grows and ships in carload lots. As a stock man he is familiar with dairy cattle and driving horses. He is an excellent judge of the latter.

SUBJECTS: "Growing Peaches," "Growing and Marketing Early Vegetables," "Construction and Management of Green-house."

FRASER, W.S., Bradford.—Mr. Fraser is one of the pioneer Institute workers of Ontario. In the early days when Institute work was in its infancy he attended the meetings as the "practical" man, on deputations composed largely of college professors. He is a thoroughly practical farmer. He is well acquainted with most of the farm problems, and, having been over the entire Province of Ontario as well as in most of the other Provinces on Institute work, has become a valuable worker. Mr. Fraser obtained a silver medal from the Agricultural and Arts Association for the appearance of his farm some years ago.

SUBJECTS: "Noxious Weeds, and How to Combat Them," "Improvement of Seed," "How to Obtain Clovers, and Their Value," "Sheep: Breeding and Management," "Soil Cultivation and Conservation of Moisture," "Underdraining," "Feeds and Feeding." Evening: "Twentieth Century Agriculture," "Eastern and Western Canada."

GARDHOUSE, JOHN, Highfield.—Mr. Gardhouse is a well-known breeder of Shorthorn cattle and long-wool sheep. All of the prize lists of our large fairs testify to his ability to raise high-class stock. He raises most of the food for his pure-bred stock, and is prepared to tell how he cultivates his land, plants his crops and mixes his foods so as to secure the best results from his live stock. Mr. Gardhouse will be found of special value to those Institutes where the officers wish to have practical work on heavy horses, beef cattle, or sheep.

SUBJECTS: "Horse Breeding for Profit," "Care and Management of Horses," "How to Select and Feed Beef Cattle," "Care and Management of Sheep," "Raising Feed for Live Stock." Evening: "How to Improve Present Farm Conditions," "How to Interest the Young People in the Farm."

GLENDINNING, HENRY, Manilla.—Mr. Glendinning, besides breeding and feeding dairy cattle, has made a reputation as a producer of field seeds. For years he has studied the weed question, and has practically succeeded in eradicating the weed seeds from his fields and has been able to produce a quantity of seed almost free from impurities. With his seed charts, and talks on cultivation of the soil and rotation of crops, he has helped many

farmers in Ontario to improve their methods of farming, and to increase their profits. Mr. Glendinning is a most successful dairy farmer, and a director of the Eastern Dairymen's Association. He has made a marked success of growing alfalfa.

SUBJECTS: "Feeds and Feeding," "Growing Clover and How to Save It," "Growing Red and Alsike Clover for Seed," "The Dairy Cow," "The Farm Water Supply," "Cultivation of Soil, and Destruction of Weeds." Evening: "Beautifying the Farm Home," "Farm Conveniences."

GROH, ANSON, Preston.—Mr. Groh has demonstrated how a very ordinary farm can be made a money-maker to its owner at the same time that the fertility is being increased and improvements paid for. Mr. Groh has given close attention to farm forestry, a subject of importance to Ontario farmers. He has nine years' continuous daily milk records of his herd. His experience in building silos, stables, walls and tanks with cement, and in the use of gasoline engines, renders his instruction on these lines of special value to farmers.

SUBJECTS: "The Farmer's Wood Lot," "Breeding, Feeding and Management of a Dairy Herd," "Bacon Hogs," "Systematic Rotation of Crops," "Soil Moisture; Its Importance and Conservation," "Clover and Lucerne." Evening: "The Stairway to Success," "The Farmer and the Sun."

GROSE, HENRY, Lefroy.—Mr. Grose is the owner of a first-class farm in Simcoe County, and has been eminently successful in general farming. He has the happy faculty of presenting hard facts in a pleasing manner, and his address to boys on the farm is very instructive and uplifting. Mr. Grose has attended Institute meetings for two seasons with acceptance, and his services should be of special value in those sections where mixed farming is followed.

SUBJECTS: "How to Increase and Maintain the Fertility of the Soil," "Selection of Seed," "Home Dairy Work," "The Growing of Clover." Evening: "Making Farm Life Attractive for the Boy," "Benefits of Institute Work."

HALLMAN, A. C., Breslau.—Mr. Hallman was born and raised on a farm, and has been farming for himself for over 20 years with great success, having built up an impoverished farm. He is a well known breeder and feeder of dairy cattle, and for years has been a prize winner for hogs at some of our leading exhibitions. He has also judged at many of our fairs, including Toronto Industrial, hence his talk on the improvement of live stock has been well received by many farmers.

SUBJECTS: "How to Improve Our Live Stock; Their Care and Feeding," "The Bacon Hog and Export Trade," "Cultivation of Corn and the Silo," "Growing Sugar Beets for the Factory," "Home Dairying," "Noxious Weeds." Evening: "The Farmer's Fruit Garden," "Poultry on the Farm."

HILBORN, J. L., Leamington.—For a long time the name of Mr. Hilborn has been familiar as one of the leading fruit-growers in Lambton County. He owns a splendid fruit farm on the north shore of Lake Erie, which bears every evidence of thrift and prosperity. His buildings are neatly painted, and no weeds are allowed to grow to the detriment of the crops. A 6,000 gallon tank holds water which is used for irrigation.

SUBJECTS: "Growing Early Vegetables for Commercial Purposes," "Care and Cultivation of a Peach Orchard," "Cement for Building Purposes," "The Farmer's Fruit and Vegetable Garden."

HUME, ALEX., Menie.—Mr. Hume is a noted Ayrshire breeder in the County of Northumberland. He is also a noted prize winner at our fall fairs, and as he is well prepared to discuss the dairy herd from all standpoints his services will be appreciated.

SUBJECTS: "Building Up a Dairy Herd—Breeding and Selecting, Feeding and Care," "Stable Construction and Water Supply," "Growing of Suitable Crops for Dairy Herd," "The Bacon Hog," "Rotation of Crops, and Application of Manure." Evening: "Advantages of Farm Life."

JAMES, D., Langstaff.—Mr. James took possession of the farm on which he now resides some thirty-four years ago, and has succeeded in converting it from a bed of weeds and rubbish into a clean, systematic and well-equipped farm. He is a believer in general farming, as will be seen from his list of subjects. Some thirty years ago Mr. James and his neighbors formed an association and held weekly meetings throughout the winter. At that time he began the collection of a library, and to-day has one of the best equipped agricultural libraries to be found among practical farmers.

SUBJECTS: "Destruction of Weeds," "Home Dairying," "Growing and Curing Alfalfa," "Corn for Ensilage," "The Farmer's Wood Lot." Evening: "Some Mistakes Made by Farmers," "Hits and Misses."

JONES, HAROLD, Maitland.—For a long time it was thought that the St. Lawrence Valley would never become a fruit-growing district. Mr. Jones, however, has demonstrated to the contrary. He is one of the men who has made the apple, known as the "McIntosh Red," famous throughout the world. On his farm is located one of the Provincial Fruit Experiment Stations, and through this Mr. Jones has for years demonstrated to the farmers throughout the Valley the benefits to be derived from clean cultivation, proper fertilizing, and persistent spraying. As the result of careful spraying Mr. Jones has raised large crops of fine potatoes, while those of his neighbors were ruined by rot.

SUBJECTS: "How to Manage Our Fruit Orchards; Planting, Cultivating, Fertilizing, Harvesting, Packing, etc.," "Life History of Some of Our Troublesome Insects," "Spraying, and Why We Do It," "Potato Culture and Treatment for Blight and Rot." Evening: "The Balance of Nature, Bird Life and Insect World."

JOHNSON, D., Forest.—Mr. Johnson is a successful grower and shipper of apples and other large fruits and has a good practical knowledge of all lines of farming. He is specially interested in the co-operative production and marketing of fruit which has been carried on so successfully at Forest. This success has been due largely to Mr. Johnson's efforts.

SUBJECTS: "Care and Cultivation of Fruit," "Insects and Fungi Affecting Fruit and Trees," "The Spraying of Fruit," "Marketing and Shipping of Fruit," "Co-operation."

KERR, W. J., Ottawa.—Mr. Kerr has been an extensive grower of small fruits and vegetables for the past fifteen years, and has been able to keep in touch with the work along these lines at the Central Experimental Farm. Mr. Kerr has attended special series of orchard meetings, and his addresses to farmers in Eastern Ontario as to the possibilities of fruit-growing should prove an incentive to them to go more largely into this profitable branch. Mr. Kerr was one of our most valued Institute workers in the winter of 1906-1907.

SUBJECTS: "Commercial Fruit Growing," "How to Dispose of Surplus Fruit," "Marketing of Fruits and Vegetables," "Short Talk on Poultry," "The Farmer's Fruit Garden," "How to Interest the Young Folks in the Home," "Decorating the Home Grounds."

KEWLEY, H. D., Sarnia.—Mr. Kewley is an associate of the Agricultural College, and since leaving that Institution has made a success of general farming, giving special attention to the breeding of draught horses, production of sheep, and the fattening of beef cattle. Mr. Kewley's college training, and practical experience on the farm should render him one of the most acceptable Institute workers.

SUBJECTS: "Our Horse Supply," "Tile Drainage," "Sheep Breeding for Profit," "Cultivation and Rotation," "Present Outlook for Young Men."

KITCHEN, E. W., Lovering.—Mr. Kitchen cleared his farm from the original forest and has been in close touch with agricultural matters in Ontario for over thirty years. He is specially efficient on the subject of "Poultry Raising" and is in a position to give up-to-date and valuable instruction upon all branches of the industry.

SUBJECTS: "Improvement, Feeding and Marketing of Poultry from a Farmer's Standpoint," "The Hog, Its Profits to the Farmer," "Our Lands for Dairying or Feeding Purposes." Evening:—"Our Homes for Our Boys—not a Building only but Home."

KYDD, W. F., Simcoe.—Mr. Kydd talks on horses, dairy cattle and small fruits. He has had a large practical experience in all these departments, and being an aggressive, forceful speaker, his words carry weight. He has also had wide experience in Fair matters, having been superintendent of the horse department of probably the largest purely agricultural show in the Province. He is also a judge of both light and heavy horses, and, as such, has been invited to place awards in many parts of Ontario. He is one of our most acceptable Institute speakers, and has done similar work in other Provinces.

SUBJECTS: "Am I Raising the Most Profitable Horse?" "The Dairy Cow, Her Summer Feed and Winter Care," "Small Fruits and Care of Grape Vines," "Potato Spraying," "Ventilation of Farm Buildings." Evening: "Dropped Stitches."

LAPIERRE, L. A., Paris.—Mr. LaPierre has had the advantage of a college training, and since leaving the Agricultural College has been engaged in practical farming. He is a forceful speaker and is prepared to impart valuable information gained from his college course, and practical experience.

SUBJECTS: "Rotation of Crops and Cultivation," "Choice and Feeding of Beef Cattle," "The Bacon Hog," "Heavy Horses," "Seed Grain

and Destruction of Weeds," "Educational and Social Requirements of the Farmer."

LAVERY, J. F., V.S., Sunderland.—Dr. Lavery is a veterinary surgeon of extended experience in the locality in which he lives. This practical experience, together with the fact that he has carried on farm operations during a good deal of the time that he was practising, places him in a position to be of special value as an Institute worker. His addresses on live stock problems are very instructive, and the boys and young men should not fail to hear them.

SUBJECTS: "The Comparative Anatomy of the Digestive Organs of Horses and Cattle, and Foods Suited to Each," "The Diseases of Brood Sows, and Simple Remedies," "Diseases Affecting the Young Colt, and Remedies," "Care of the Mare and Colt." Evening: "Examination of a Horse for Soundness," "The Jurisprudence of the Sale or Exchange of Horses."

LEE, ERLAND, Stoney Creek.—Mr. Lee has made his reputation as a practical dairy farmer. He is familiar with all kinds of farm work, as well as the manufacture of milk into butter. He practises soiling to a large extent with his cows. Having been secretary of South Wentworth Farmers' Institute for many years, he is in a position to give assistance and advice of value to officers.

SUBJECTS: "The Codling Moth and Apple Scab," "Conservation of Soil Moisture," "Breeding and Feeding of the Dairy Herd," "Care of Milk for the Factory and Creamery," "Home Dairying," "Treatment of Milk Fever," "The Silo." Evening: "Improvement by Selection."

LEITCH, A., Deseronto.—Mr. Leitch spent the first twenty years of his life upon a dairy farm in Stormont County. He has had extensive experience in managing large farms since his graduation from the Agricultural College. Mr. Leitch will be prepared to conduct classes in the judging of dairy cattle and swine. He was a member of the judging team sent to the International Live Stock Show in Chicago in 1904.

SUBJECTS: "Caring for and Feeding Dairy Cattle," "Sanitary Handling of Milk," "Production of Bacon," "Growing of Corn for the Silo," "Cultivation and Rotation." Evening:—"Farm Labor Problem," "Education of the Boy on the Farm," "Agricultural Economics."

LENNOX, W. J., B.S.A., Newton Robinson.—Mr. Lennox is the son of a successful farmer in the County of Simcoe, and has always taken an active interest in the work as conducted on his father's farm. He has taken special pride in the production of different kinds of fowl since he was a mere lad and has won many prizes at local exhibitions. Mr. Lennox lives in the midst of a section noted for the production of alsike and red clover, and has been successful along these lines for a number of years. The young men and women of the farm should be much benefited by what Mr. Lennox has to say, for, although he is a comparatively young man, he has already shown what can be done by systematic study and close application.

SUBJECTS: "Sheep, Breeds and Management," "How to Improve Our Live Stock," "Judging of Beef Cattle and Sheep," "Poultry for the Farmer." Evening: "The Farmer's Garden," "Training of Young Horses."

Lewis, F. M., Burford.—Mr. Lewis has had much to do, as secretary, with the success of the South Brant Farmers' Institute. He has followed farming all his life, and is the owner of a good orchard and pays special attention to the production of potatoes. His success as a feeder of steers for beef, and pigs for bacon has been quite marked.

Subjects: "Growing and Feeding of Alfalfa," "Clover, the Key to Successful Farming," "Green and Barnyard Manures, their Care and Application," "Corn Growing, and the Silo," "Potato Growing," "The Farmer's Interest in Denatured Alcohol," "Waste Places."

Lick, Elmer, Oshawa.—Mr. Lick makes a specialty of fruit culture. He has had charge of a large orchard for a number of years, and when the Fruit Marks Act was passed by the Dominion Government he was one of the first inspectors to be appointed by the Dominion Department of Agriculture. In this capacity he has had opportunity of looking into all matters connected with the fruit industry, from the cultivation of the soil to the disposing of the products. He, therefore, speaks with authority, and can view the question both from the producers' and the commercial standpoint.

Subjects: "The Production of Apples," "Marketing Apples," "The Uses of Cement About the Farm," "Growing Corn," "The Farmer's Garden."

McKenzie, A. G., Fairview.—Mr. McKenzie is a successful, practical farmer, who has had the advantage of College training. He is a close student, and thoroughly practical. He has the faculty of imparting knowledge in a clear and forceful manner.

Subjects: "The Principles of Cultivation and Rotation," "Laying Out of the Farm, and Planning of Buildings for Utility Purposes," "Beef Cattle," "Dairy Cattle," "Swine," "Heavy Horses."

McMillan, Thos., Seaforth.—For many years Mr. McMillan has taken a deep interest in Institute work, being president of his local Institute at the present time. He is a practical farmer and makes a specialty of beef cattle and heavy horses. His advice on general farm practices is based upon years of successful experience and observation. His talk to young people is most inspiring and the young men especially cannot well afford to miss the opportunity of hearing him.

Subjects: "The Heavy Horse; How to Breed and Feed," "Breeding and Marketing of Beef Animals," "Soil Cultivation and Crop Rotation." Evening: "The Demands of Canadian Agriculture," "A Talk to Our Young People."

Mason, T. H., Straffordville.—When the Ontario Agricultural College at Guelph first opened its doors to farmers' sons, Mr. Mason was one of the first to enroll. He spent two years at the Institution at that time, and has been able, as a result of his College work, to put into practice on his own farm so many modern ideas and methods, that his neighbors have found his farm and farm work a constant inspiration to them. Mr. Mason made a specialty of dairying, hog raising, and production of corn. He has kept in close touch with the work of the College through all the years and can give much of value regarding the work of that Institution, as well as of the Experimental Union. Mr. Mason is engaged during the greater portion of the year in work under the direction of the Seed Division of the Dominion Department of Agriculture.

SUBJECTS: "Care and Food of Dairy Cattle," "Hog Raising," "Sheep Raising," "Corn for Silage," "Maintenance of Soil Fertility," "Seed Improvement." Evening: "A Trip to the Maritime Provinces," "Changing Conditions of Ontario Agriculture."

MITCHELL, J. W., Superintendent Eastern Dairy School, Kingston. Mr. Mitchell has been closely identified with the dairy interests of Ontario for some years. He acts as Superintendent of the Dairy School in the winter months, and in the summer instructs the creamery men throughout the eastern portion of the Province. Mr. Mitchell is well qualified to advise the farmers, proprietors and manufacturers with reference to the production and handling of milk, and the manufacture of the same. He is a clear and forceful speaker.

SUBJECTS: "The Cream Gathering Creamery," "Care of Milk for Cheese Factories and Creameries," "The Present Requirements of the Dairy Industry."

NASH, C. W., 94 Lee avenue, Toronto.—Mr. Nash has an international reputation on the subjects that embrace natural history. He has long been an authority on birds, and has written bulletins both for the Department of Agriculture and for the Department of Education on this important subject. His talks also deal with plant and insect life, as well as the rearing and breeding of domestic animals. Probably there is no one on the staff who can better interest young people at Institute meetings than Mr. C. W. Nash.

SUBJECTS: "How Plants Grow," "Breeding of Domestic Animals," "The Value of Our Birds," "Our Insect Pests," "Nature About the Farm," "Farm Forestry."

NESS, ROBT., Howick, Que.—It is only necessary to state that the Robert Ness referred to is the well-known importer and breeder of Ayrshires and Clyde horses. His successes in the show ring are well known to all who are at all acquainted with the exhibitions of dairy cattle. Mr. Ness' successes at the National Dairy Show, Chicago, 1907, are fresh in the minds of Ontario dairymen.

SUBJECTS: "The Breeding and Feeding of Heavy Horses," "Dairy Cattle," "The Improvement of Live Stock."

ORR, J. E., Fruitland.—Mr. Orr lives on a 125-acre fruit farm, nearly every foot of which is devoted to fruit-growing. Living, as he does, in one of the best sections of the Niagara District, and specializing as he does in the production of fruit, Mr. Orr has a technical knowledge of this subject possessed by few men of his age. From the cultivation of the soil to the marketing of the fruit, he is familiar with every detail.

SUBJECTS: "Some Insect Enemies of the Orchardist," "Mistakes Made in Spraying," "Notes on Plums," "Controlling the Codling Moth," "The Black Knot, and How We Exterminated It in Our Township," "The Culture and Care of Fruit Trees," "Can We Overcome Off Years in Our Orchards?" "How and When to Prune."

PAGET, J. N., Canboro.—Mr. Paget is well known in dairy circles through his connection with the Western Dairymen's Association. He has been either director or president for a number of years, and is now a member of the directorate. Mr. Paget is particularly well known in his own district

for the aggressive and up-to-date methods he has adopted in conducting his dairy business. He is not only a thoroughly practical man, but is capable of presenting the results of his experience in a clear and forceful manner.

SUBJECTS: "Care and Production of Milk," "Profit and Loss in Dairying," "Handling the Finished Product Until it Reaches the Consumer," "The Growth of Alfalfa and its Importance to Dairymen." Evening: "The Relation Which Should Exist Between Producer, Proprietor and Maker."

PEARCE, JOHN S., London.—The name of John S. Pearce is well known throughout Ontario, particularly in the West, as being the head of a most reliable seed firm for many years. Some four or five years since Mr. Pearce gave up business to take charge of the parks and gardens and general horticultural work in London. He has had extended experience in Institute work, and his addresses on the selection of seed, planting of trees, etc., will be found very instructive.

SUBJECTS: "Selection, Care and Cultivation of Seeds," "Hints to the Flower Lovers," "Trees, and Tree Planting for the Farm, School, Church, Cemetery and Roadway," "Pruning and Care of Trees," "Shrubs, Bulbs and Flowers."

PEART, A. W., Burlington.—Mr. A. W. Peart is well known as one of the successful fruit men of the Burlington District. His many duties in a private and public capacity prevent him from undertaking much Institute work. His services are always sought for and the instruction given is much appreciated by fruit men generally.

SUBJECTS: "Apples, Pears, Plums, Blackberries, Raspberries, Currants, their Varieties, Cultivation, Marketing, etc.," "Insects and Fungi Injurious to Orchards, and Methods of Combating Them," "Underdraining," "Management of Soils," "The Application of Fertilizers," "Agricultural Education," "Leaks on the Farm."

PEART, H. S., B.S.A., Jordan Harbor.—Mr. Peart is the son of a prominent fruit-grower, and has had the advantage of a full course in Horticulture at the Agricultural College, as well as experience as a teacher in the Horticultural Department of that institution for a couple of years. He has been appointed to superintend the Fruit Experiment Station at Jordan Harbor. Mr. Peart has given special attention to the production of small fruits and vegetables, and is prepared to give instruction along all lines of fruit-growing.

SUBJECTS: "Production of Small Fruits," "Pruning and Grafting," "Production of Crops for Canning Factories."

PHILP, JNO. R., Maple Lane.—Mr. Philp is a practical farmer and has for many years carried on farming operations on his 150 acre farm in South Grey. He is enthusiastic about the value of short rotation for combatting weeds, and the appearance of his farm proves that he has made good use of the short rotation, as he has one of the cleanest farms in South Grey. His past experience in public speaking should enable him to present his subjects in a clear and forceful manner.

SUBJECTS: "Growing Clover for Seed, Including Seeding, Harvesting, Threshing, Cleaning, Marketing, etc; also Curing for Hay, and Value as a Fertilizer," "The Growing of Jerusalem Artichokes for Hogs," "Planting

Trees and Beautifying the Farm," "Care and Application of Manure," "Cultivation and Crop Rotation Including Rape and Clover," "Farm Water Supply."

Publow, G. G., Chief Dairy Instructor for Eastern Ontario, Kingston. —Mr. Publow is well known in the Province as the man who has done so much to improve the quality of cheese in the eastern sections of Ontario. He has been Chief Instructor since the syndicate system was inaugurated, and knows better than any other man the requirements of the different sections. His addresses upon the "Sanitary Requirements of Cheese Factories" and "The Production and Care of Milk Upon the Farm" are presented in a forcible and convincing manner.

Subjects: "The Production and Care of Milk for Cheese Factories," "The Importance of Properly Built, Well Equipped and Sanitary Factories," "Skill and Forethought Essential in the Manufacture of Cheese," "The Cheese Industries of the Dominion."

Race, T. H., Mitchell.—Mr. Race is one of the best known, and most acceptable Institute speakers in Ontario. He has had experience in this work in company with Dr. Mills and the late John McMillan in the early history of the organization. Mr. Race spent his early life on the farm, but left it at the age of 20 to follow mercantile pursuits. After a business experience of six years he entered journalism, which he has followed successfully for a number of years. Mr. Race was appointed Canadian Commissioner at the World's Fair, St. Louis, and in Great Britain.

Subjects: "Planting and Care of Commercial Orchards," "The Fruit Garden for every Farm." Also five minutes' talk on the following subjects:—"Roses," "Bedding Plants," "Care of Flowers," "The Lawn," "Soil Formation and Fertility," "The Farm Home and Its Environment," "The Farmer's Position—What it is and What it Should Be."

Raynor, T. G., B.S.A., Ottawa.—There will be few, indeed, of our readers who do not know Mr. Raynor. He has been in nearly every Institute district in Ontario, as well as in some of the States of the Union. He is a good speaker and is thoroughly familiar with his subjects. He is a graduate of the O.A.C., has been president of the old Central Farmers' Institute, and has been identified with nearly every progressive agricultural movement in Ontario during the past twenty years. Mr. Raynor now has charge of the Ontario work under the direction of the Seed Division of the Dominion Department of Agriculture.

Subjects: "Feeds and Feeding," (Illustrated) "Forestry," "Grading Up a Herd or Flock," "Corn and Clover," "Soil Cultivation," "The Production of Pork," "Noxious Weeds and Methods of Destroying Them," "A Forward Movement in Field Agriculture," "How to Increase Our Dairy Profits," "The Farmer and the New Seed Control Act." Evening: "Agricultural Development," "Mistakes in Farming."

Reed, Dr. Henry G., Georgetown.—Having had a good practical farm training, and a thorough course in veterinary science, Dr. Reed is able to deal not only with the problem of breeding and feeding live stock, but can also discuss the question of "Domestic Animals in Health and Disease." Dr. Reed has been much in demand to judge live stock at fall fairs, and his Institute work has been entirely satisfactory and much appreciated.

Subjects: "Principles and Practice of Stock Breeding," "Horse Breeding for Profit," "Horse Breeding and Care in Relation to Diseases," "Diseases of Digestive System of Cattle," "Brood Mare and Foal," "Parturient Diseases of Dairy Cows."

Rennie, Simpson, 454½ Ontario street, Toronto.—The name of Rennie needs no introduction to the farmers of Ontario. Mr. Simpson Rennie was connected with the Agricultural Club formed in Scarboro Township thirty-five years ago, and attributes much of his success to the knowledge gained from the papers and discussions given at the club long before the establishment of Farmers' Institutes. Mr. Rennie is one of the best authorities we have on all lines of general farming. His farm won the gold medal in the "Good Farms Competition" in Ontario in 1883.

Subjects: "Weeds and How to Eradicate Them," "Rotation and Cultivation of Crops," "How to Improve Seeds and Grain by Selection," "Cultivation of Roots and Corn."

Reynolds, A. J., Scarboro' Junction.—Mr. Reynolds is secretary of East York Institute. Besides the regular Institute meetings he and his fellow workers have held a series of special meetings conducted entirely by local talent, and without any assistance from the Department. The Annual Seed Fair of East York, of which Mr. Reynolds is also secretary, has proved a very instructive line of work for the Institute members. Unfortunately Mr. Reynolds cannot conveniently leave home for a long trip, but we are glad to place his name on our reserve list.

Subjects: "The Dairy Cow; Her Care and Feed," "Corn and the Silo," "Clover Growing," "Objects and Methods of Cultivation," "Seed Fairs," "Sugar Beets."

Rocheleau, Denis, Tecumseh.—Mr. Rocheleau is one of the successful farmers of Essex County, and has been particularly successful in the production of market garden crops. His experience as a dairyman and of general farm work renders his instruction along these lines of special value. Mr. Rocheleau is able to give his instruction in both French and English.

Subjects: "Home Dairy Work," "The Farmer's Fruit and Vegetable Garden," "The Growing of Potatoes," "Cultivation of the Land."

Sanders, W. D., Exeter.—Mr. Sanders has been connected with Institute work in South Huron for about seven years. He is now president of that Institute and takes an active interest in other agricultural organizations of the locality. Mr. Sanders had made a success of farming. This he attributes to his close study and observation right on the farm. He is an experienced breeder of horses, cattle, sheep and swine.

Subjects: "Care and Application of Farmyard Manure," "Short Rotation, Its Effects Upon Weeds," "The Fertility of the Soil, and Labor-Saving Methods in Preparing Root Land," "Our Duties and Privileges on Farms."

Shaw, John C., Norwich.—Mr. Shaw is a successful farmer in the County of Oxford, having removed from the County of Wentworth some few years ago. Since coming to South Oxford he has demonstrated that money can be made from a run-down dirty farm at the same time that it is being put in first-class condition. Mr. Shaw's advice on this line of work,

as well as upon general farm topics, should prove of interest and benefit to the districts which he may visit. Mr. Shaw has won medals for excellence in quality of farm products as well as for the appearance of his farm.

SUBJECTS: "How to Increase the Production of the Average Farm," "The Buying and Building Up of Run-down Farms as an Investment," "The Prevalence of Weeds, and How to Eradicate Them."

SHEARER, W. C., Bright.—Dairying is the particular department of farming in which Mr. Shearer has been eminently successful. He is thoroughly practical, a good speaker, an Institute man of experience for some years past, and is a most acceptable delegate. As will be seen from his subjects, Mr. Shearer is also prepared to discuss the bacon, seed and corn questions.

SUBJECTS: "Rotation of Crops and Selection of Seed," "Breeding and Feeding the Bacon Hog," "The Dairy Cow for Profit," "Growing Corn Successfully." Evening: "Farming Profitably."

SHEPPARD, FRED A., Queenston.—Mr. Sheppard is a successful fruit farmer in the celebrated Queenston District. He has made a specialty of packing fruit in fancy boxes for the best trade. He has also been particularly successful in grafting and budding, and gives illustrations of both these methods of propagation at the meetings. He is also a producer of tomatoes, and talks tomato culture from the cold-frame to the market.

SUBJECTS: "Propagation of Fruit Trees, Vines, Care of Orchards and Vineyards," "Clover, Corn and Roots," "The Importance of Soil Moisture and How to Conserve It," "Small Fruit for the Home Market," "Insects and Fungii Injurious to Our Fruit Crop," "Weeds, and How to Destroy Them," "Some Advantages of Living on a Farm."

SHERRINGTON, A. E., Walkerton.—Mr. Sherrington is well up in matters pertaining to fruit culture, and is known in the Lake Huron District as a "co-operative farmer," for he believes that "in union is strength." Mr. Sherrington has paid special attention to the subject of co-operation, and has been influential in establishing many co-operative fruit associations in Ontario.

SUBJECTS: "Orchard Management," "Planting, Pruning and Grafting," "Spraying as a Preventive of Insects and Fungus Diseases," "Co-operative Marketing of Farm Products," "Conservation of Soil Moisture," "Selection of Seed Grain and the Eradication of Weeds," "The Importance of Uniformity, Quantity and Quality in Farm Products" (afternoon or evening). Evening: "The Farmer's Fruit Garden," "Beautifying a Farm Home."

STANDISH, DR. J., Walkerton.—After a thorough training in practical work on his father's farm in the County of Wellington, Dr. Standish took a course in veterinary science and followed that profession for some twenty-five years. He has done considerable Institute work in Ontario, and the other Provinces of the Dominion. He has been a prominent judge of live stock at fall fairs for the past thirty years. Dr. Standish is an authority on the subject of horses, beef cattle, and bacon hogs, and is also prepared to discuss general farm management, as he has brought a run-down farm into excellent condition.

Subjects: "Breeding of Horses," "Selection and Feeding of Beef Cattle," "Requirements of the Bacon Hog Industry," "Diseases of the Digestive System of Cattle," "Unsoundness in Horses and the Best Means of Detecting the Same." Evening: "Training of the Young Horse."

Stephen, W. F., Huntingdon, Que.—Mr. Stephen is widely known as a successful breeder of Ayrshire cattle, and has been sought after through the whole Dominion as a judge of dairy cattle. Mr. Stephen is the owner of a good working herd of pure-breds, and his address upon "The Growing of Crops Suited to Dairy Cattle" and "The Dairy Cow" should prove of special interest in dairy sections.

Subjects: "Soil and Tillage," "Corn and the Silo," "The Dairy Cow; How to Rear and Feed Her," "Good Roads and How to Make Them," "Keeping Farm Accounts and Records," "Stable Manure and Fertilizers." Evening: "How to Interest the Boys and Girls in Farming," "Making the Most of Farm Life."

Stevenson, R. S., Ancaster.—Mr. Stevenson is one of the oldest Institute workers in Ontario. Being a practical dairyman and breeder of dairy cattle, he has been identified with advanced dairy work in Ontario for a long time. During the past few years he has acted as judge of live stock at many fall fairs, and has given excellent satisfaction. No matter where he goes, Mr. Stevenson is always welcome, and is recognized as a man who thoroughly understands the work he undertakes to discuss.

Subjects: "A Practical Talk on Dairy Cows, Breeding, Feeding, Selecting, etc.," "Growing the Corn Crop and Handling It to the Best Advantage," "The Growing of Root Crops," "The Cream Separator on the Farm," "The Farm Water Supply."

Swale, Cecil, Wiarton.—Mr. Swale is enthusiastic about corn ensilage. He has found it a paying feed, and has made many converts to its use in his locality. Mr. Swale is one of Ontario's most successful potato growers. This subject should receive greater attention on the part of Ontario farmers.

Subjects: "Corn, Mangels and Hay," "Modern Potato Culture," "Rearing and Feeding of Sheep," "Clover Production and Destruction of Weeds," "Care of Our Own Forests," "Beneficial Birds of Prey, and Poultry Production," or "Our Feathered Friends in Relation to Poultry Production."

Wagg, A. J., B.S.A., Mindemoya.—Mr. Wagg is a graduate of the O.A.C., and a specialist in dairying. After graduation he returned to Manitoulin, and has been doing pioneer work in dairying for some years past. He is the owner of a large creamery in Mindemoya, and it was because of his success in this work that he was chosen for the larger field of Institute work.

Subjects: "Selection and Management of Dairy Cattle; Calf, Heifer, Cow," "Soil Fertility in Relation to Dairy Farming," "Milk; Secretion, Composition, Handling and Food Value." Evening: "Methods of Creaming Milk and Home Butter Making," "Agricultural Education," "Conditions in New Ontario for the New Settler."

Warren, J. L., Acton.—Mr. Warren has had experience as secretary of Halton Institute, and it was due largely to his aggressive work that it became the banner Institute for Ontario some years ago. He is a thorough,

practical farmer, and his addresses are interesting and instructive. Institute officers will find Mr. Warren competent to give them valuable information as to conducting local Institutes.

SUBJECTS: "Clover as a Feed and Fertilizer," "Corn and the Silo," "Breeding and Feeding of Beef Cattle," "Some Methods of Destroying Weeds." Evening: "How to Make Our Institute Successful," "The Education of Our Sons and Daughters."

WIDDIFIELD, J. W., B.S.A,. Uxbridge.—Mr. Widdifield has, since his graduation from the O.A.C., managed a farm successfully in Ontario County. Mr. Widdifield is much sought after to assist in local Institute work, and his success as a practical farmer has induced the Department to send him to a few regular meetings. After visiting the North-West, Mr. Widdifield returned well satisfied with the conditions in Ontario, and should be able to state to the young farmers of this Province something which will be an incentive to them to put forth greater efforts to improve and extend their agricultural operation.

SUBJECTS: "Increasing and Preserving Soil Fertility," "Clover, Corn and Roots," "Implements of Cultivation, and Their Proper Uses," "How to Preserve a Moist Soil in a Dry Season," "Destruction of Noxious Weeds," Evening: "Nature Study," "The Poetry of Farm Life."

AGRICULTURAL TEACHERS IN HIGH SCHOOLS.

The teachers named below have been appointed to give special instruction along agricultural lines in the High Schools at the places indicated. They also act as representatives for the Department of Agriculture for Ontario in the districts surrounding the places at which they are located. These gentlemen will not be available for regular Institute work, but will be able to attend many of the meetings in their respective localities.

The officers of the Institutes concerned should place themselves in communication with the local representatives and make arrangements for them to attend as many meetings as possible. Always address them care of Collegiate Institute.

HAMER, R. S., B.S.A., Perth, Ont.—Mr. Hamer is a son of one of the most progressive farmers in South Simcoe, a graduate of the Ontario Agricultural College, and was for some time editor of the *O. A. C. Review*. He also spent two years on the western staff of the *Farmers' Advocate*. Mr. Hamer was a member of the College team which won the trophy for stock judging at Chicago in 1906, and had the distinction of being first in individual score.

SUBJECTS: "Value of Soiling Crops," "Individual Cow Testing," "Paying According to Test," "Canada's Bacon Trade," "Agricultural Educatio ."

HART, F. C., B.S.A., Galt, Ont.—Mr. Hart was brought up on a farm in Cumberland County, Nova Scotia. He is a graduate of the Ontario Agricultural College in Biology, and spent two years in the Dominion Forestry Branch, working on reserves in Manitoba and Saskatchewan.

SUBJECTS: "Common Fungus and Bacteriological Diseases," "Beneficial Insects," "Traps and Sprays," "Weed Seeds and the Seed Control Act."

McKenney, A., B.S.A., Essex, Ont.—Mr. McKenney, after considerable experience in Institute work, entered upon a course at the Ontario Agricultural College, from which he is a graduate. Since that time he has addressed a great many audiences along agricultural lines. Mr. McKenney is a first-class judge of live stock, having been a member of the College team which won the trophy at Chicago in 1906.

Subjects: "Seed Grain Selection," "Weeds and their Eradication," "San José Scale," "Corn Breeding," "Tobacco Fertilizer," "Canning Factory Products." Evening: "Agricultural Education for the Farmer's Son."

Mortimer, R. E., B.S.A., Collingwood, Ont.—Mr. Mortimer comes from Dufferin County, where he was brought up on the farm. He is a most practical young man and favorably impressed the College staff when taking his course for the Agricultural degree. For two years after graduation he put his technical knowledge to practical use upon his father's farm.

Subjects: "A Quiet Talk to Farmers," "Eradication of Weeds," "Birds in Their Relation to Agriculture," "The Bacon Hog," "Mutton Sheep," "Beef Cattle," "The Dairy Herd," "Home Dairying," "The Fruit Plantation," "Beautifying the Home."

Munroe, W. A., B.S.A., Morrisburgh, Ont.—Mr. Munro is a graduate of Queen's University, also of the Agricultural College, Guelph, and has the advantage of being thoroughly familiar with the practical work of the farm. In 1905 he was a member of the stock judging team at Chicago, and in 1906 was a member of the travelling dairy and stock judging school in Alberta.

Subjects: "The Building Up of the Dairy Herd," "The Sanitary Production of Milk," "Rotation and Cultivation," "The Education of the Farmer's Son."

Reed, F. H., B.S.A., Lindsay, Ont.—Mr. Reed was born and brought up on the farm. He decided to take the full course at the Agricultural College, where he was for two years a member of the staff, having been selected to occupy the position of resident master and instructor in English.

Subjects: "Tile Drainage—Its Cost and Its Returns," "The Bacon Hog and Dairy Cow," "Beef Production and Permanent Pastures," "Selling Milk According to Test," "Agricultural Education—What It Means and What It Costs."

LADY SPEAKERS.

Backus, Mrs. A. H., M.D., Aylmer.—The Women's Institutes of Ontario are to be congratulated on securing the services of Dr. Annie Backus as one of its lecturers. Having been brought up on the farm, she is familiar with rural conditions and knows the secrets of success. She is a keen observer and is always able to give valuable information and timely advice particularly applicable to the locality visited.

Subjects: "Hygiene of the Home and Aids in Nursing," "Consumption and Its Prevention," "The Importance and Meaning of Woman's Work," "Training in the Home," "Education of Girls," "Poultry Raising," "The Horse—Its Use and Abuse."

CAMPBELL, MRS. COLIN, Box 517, Windsor.—Mrs. Campbell was secretary of the West Huron Women's Institute and under her guidance it became one of the strong Institutes of the Province. For several years she has been an acceptable speaker at Farmers' Institute meetings, and a glance at her subjects will show that she is prepared to speak on many helpful phases of woman's work.

SUBJECTS: "The Care and Uses of Milk," "Canning Fruits and Vegetables," "Poultry Raising," "Practical Housekeeping," "A Comparison of Our Common Foods," "The Housekeeper and Her Importance to the State."

CAMPBELL, MISS SUSIE, Brampton.—Miss Campbell has been a regular delegate to the Women's Institute meetings for two seasons, and her advice to Institute officers is much appreciated. She is able to enthuse her audiences and to induce the members generally to take renewed interest in the work.

SUBJECTS: "The Ideal Home," "Character," "A Young Woman's Accomplishments," "Our Fair Dominion," "The Influence of Women," "Demonstrations in Needlework."

CARTER, MISS GERTRUDE, Guelph.—Miss Carter is a graduate of the Guelph Dairy School and since her graduation has spent several seasons in her father's creamery. Miss Carter is a public speaker of ability. She is prepared to speak not only on all questions pertaining to the handling of milk and the manufacture of butter, but also on the very important subject of sewing.

SUBJECTS: "Sewing, Demonstrated," "Butter Making on the Farm," "Production and Care of Milk," "Kitchens, Past and Present," "Courtesy in the Home," "Sunny Side of Life."

DUNCAN, MISS BERTHA, Emery.—Miss Duncan is a graduate of the Hamilton School of Domestic Science and has been a regular delegate at Women's Institute meetings for several seasons. While Miss Duncan's education has been secured in the city schools, her home is on the farm and she is thoroughly familiar with rural conditions. This enables her to apply her knowledge in a practical way and her services are much appreciated by the members of the Institute.

SUBJECTS: "Food Values—Demonstrations on Meats, Vegetables, and Soups," "Hints on Selection and Care of Meat," "Use of Food to the Body," "Everyday Helps for the Housewife," "Girls and Their Ideals," "The expenses of the Household."

GILHOLM, MISS B., Bright.—Miss Gilholm has been an efficient officer of the District Women's Institute of North Oxford and is able to render much assistance to officers of both District and Branch Institutes when attending their regular meetings. Miss Gilholm has taken the regular Creamery course at the Guelph Dairy School and holds a specialist's certificate in butter-making, also a diploma for proficiency in the theory and art of butter-making. Miss Gilholm's knowledge and appreciation of country life places her in a position to impart information in a manner much appreciated by the members in general.

SUBJECTS: "The Care and Handling of Milk," "Butter-making on the Farm," "Our Friends and Foes—Bacteria," "Our Ain Fireside," "Institute Work."

GRAY, MISS GERTRUDE, 650 Bathurst street, Toronto.—Miss Gray has been one of the regular lecturers at both winter and summer Women's Institute meetings for several seasons. She was engaged for Institute work in the State of New York during 1906, where her services were most acceptable. She has been re-engaged for similar work in New York State for 1907, but will be available for Ontario work in January and February, 1908. Miss Gray is a Domestic Science graduate and possesses the ability to impart her knowledge in a clear, forceful and attractive manner.

SUBJECTS: "Food Values—Demonstrations on Meats, Vegetables and Soups," "Twentieth Century Living," "Interior Decoration of the Home" (illustrated), "Eyes that See," "Life's Talisman."

MACMURCHY, DR. HELEN, 133 Bloor Street, East, Toronto.—Dr. MacMurchy's professional duties prevent her from devoting much time to Women's Institutes. However, the limited time which she gives to this work is much appreciated by the Department and by the Institute members. Her addresses are pointed, full of enthusiasm, and always adapted to the needs of the locality visited.

SUBJECTS: "Twentieth Century Health Problems," "Health and the House," "The Health of Women and Girls," "Accidents and Emergencies," "Disease Germs," "Tuberculosis," "Patent Medicines," "The Day's Work."

MCMURCHIE, MISS H., Harriston.—Miss McMurchie is a graduate of the MacDonald Institute and her practical knowledge of household matters and her familiarity with rural conditions make her a most efficient instructor in Domestic Science. Miss McMurchie has the happy faculty of presenting her information in a clear, forceful and pleasing manner.

SUBJECTS: "The Planning of a Farm House," "Books in the Home," "The Value of Pictures" (illustrated), "Table Setting and Serving" (demonstrated), "Food Values—Demonstrations in Meats, Vegetables and Soups."

MADDOCK, MISS BLANCHE, Guelph.—Miss Maddock started in Farmers' Institute work before Women's Institutes were organized, and is thus thoroughly familiar with all branches of the work. She has had experience at Institute work in British Columbia and several States of the Union. Having taken a course at MacDonald Institute in the subjects announced for her, Miss Maddock has a fund of useful information and is always welcomed by her audiences. She has shown herself capable of enlisting the sympathies of the people and getting them to work.

SUBJECTS: "Bread Making," "Our Women's Institutes and How to Make Them Interesting," "Bacteria—Their Relation to Health and Disease," "Different Cuts of Meat—Their Selection and Preparation," "Hygiene and Economic Values of Food," " A Girl's Possibilities," "Preserving and Canning of Fruits and Vegetables," "The Sanitary Home," "Home Architecture."

MILLAR, MISS BELLA, Guelph.—Miss Millar is one of our most experienced workers, having attended meetings in practically all sections of Ontario. She also took charge of a travelling dairy school in Nova Scotia for several seasons. She is able to give instruction upon all lines for general work in which the home-maker is interested. Miss Millar's special training in home nursing and emergencies places her in a position to give valuable instruction along this line.

SUBJECTS: "Co-operation between Home and School," "Mistakes made in the Farm Dairy," "Home Nursing and Emergencies," "The Story of the Institutes," "Domestic Science."

PATTINSON, MISS N. L., Bowmanville.—Miss Pattinson has had extended experience in school teaching and is a graduate in Domestic Science. Her services at Institute meetings during the past season were most acceptable to officers and members. She has the faculty of creating deep interest among her hearers when dealing with scientific subjects.

SUBJECTS: "Health in the Home," "Hints on Home Nursing" (demonstrated), "Foods; Their Constituents and Functions," "Different Cuts of Meat—Their Selection and Preparation"—Demonstrations.

PRICE, MRS. L. GRAY, 5 Howland Avenue, Toronto.—Mrs. Price is one of our most experienced and acceptable Institute workers. Her scientific training and ability to apply the same to the problems of the household, place her in a position to render specially valuable service to Institute members.

SUBJECTS: "The Value of Fruit in Our Diet," "Foods" (illustrated by charts), "Meats" (illustrated by charts), "Domestic Science on the Farm," "Making Home Attractive," "Every Man the Architect of His Own Fortune," "Home Decoration."

REYNOLDS, MISS LULU, Scarboro Junction.—Miss Reynolds has had extended experience as secretary of the East York Women's Institute. She has also assisted her father in his work as secretary of the Farmers' Institute. Her extended experience places her in a position to be of much assistance to Institute officers wherever she may attend. She is a most enthusiastic worker and her addresses are well received.

SUBJECTS: "Foods; Their Different Constituents," "Horticulture," "Character Building."

RIFE, MISS ISOBEL, Hespeler.—Miss Rife's experience as a public school teacher and her extended experience in Institute work during the past three years, place her in a position to render valuable assistance to Institutes. Miss Rife is a forceful and pleasing speaker and is well qualified to give advice and suggestions to Institute officers as to the successful extension and conduct of the work.

SUBJECTS: "Helpfulness in Women's Institutes," "Sunshine, Pure Air and the Bath," "Consumption—Education, Prevention and Cure," "The Value of Physical Development," "The Home in its Attitude to the School," "The Hygiene of Cheerfulness," "Education for Girls."

ROSE, MISS LAURA, Guelph.—Miss Rose needs no introduction to the Women's Institute members of Ontario. Her ability as a public speaker and her wide knowledge of affairs place her in a position to render the best service to the Institutes. She has charge of the Home Dairy Department at the Agricultural College and has instructed thousands of farmers' daughters in the art of butter-making. Miss Rose directs the Home Department of one of our leading papers and thus reaches a steadily increasing number of interested readers.

SUBJECTS: "The Secretion, Food Value and Care of Milk," "How to Increase Dairy Profits," "Bread and Buns," "The Womanly Sphere of Woman," "The Head, the Hand, the Heart—the Tripod of Successful Work," "The Influence of Environment."

Shannon, Mrs. B., Toronto.—Mrs. Shannon is a Domestic Science graduate and her experience as a housekeeper and Institute lecturer places her in a position to render excellent service to Institute members.

Subjects: "Household Hygiene," "Labor Saving Contrivances for the Housewife," "Home Nursing," "Comparative Value of the Different Cuts of Meat," "Food Values—Demonstrations on Meats, Vegetables and Soups."

Shuttleworth, Miss L., Guelph.—Miss Shuttleworth is familiar with the conditions surrounding Ontario farm life. Since her graduation from the Guelph Dairy School, several years ago, she has had extended experience in dairy work not only in Ontario, but also in Nova Scotia. She was in charge of the butter-making competition at the Toronto Industrial Exhibition in 1907. Her broad general experience and clear insight into her subjects qualify her as an Institute speaker of great resource.

Subjects: "Cold Dishes for Summer Use," "Fruits—Methods of Canning, Preserving, etc.," "Health as the Basis of Womanly Beauty," "Short Talks and Discussions on Cream Separators, Dairy Utensils, and Their Care; Churning, Care of Milk and Cream," "The Needs of the Dairy Industry," "Evenings at the Homestead."

Stewart, Miss M., Clinton.—Miss Stewart has taken the University course and is also a graduate in Domestic Science. Her clear, forceful manner of imparting instruction renders her a very acceptable Institute lecturer. Wherever Miss Stewart has spoken and demonstrated before Institute audiences she has been well received.

Subjects: "A Girl's Education," "Some Precautions Against Disease," "Selection and Care of Food," "Food Values—Demonstrations in Meats, Vegetables and Soups."

Yates, Miss Mary, Terrington Farm, P.O. Box 191, Toronto.—Miss Yates is a certified poultry expert from Reading University College, and a late instructor at Studley Agricultural College, Warwickshire, England. She had charge of two "laying competitions" held under the auspices of the Utility Poultry Club. In addition to her experience in Women's Institute work, Miss Yates is business manager of a very promising and profitable poultry farm. She is so practical, so thoroughly business like and withal so womanly that she is very much in demand as a lecturer.

Subjects: "The Management of Poultry," "Home Economics," "Sanitation About the Home," "Method in Business Records and Correspondence."

INFORMATION FOR OFFICERS AND DIRECTORS.

The success of the meetings during the Institute season will depend, as in past years, upon the hearty co-operation of the officers and directors of the various local organizations.

The officer with the greatest responsibility, and the one who must really act as managing director of the work is, of course, the secretary. He cannot, however, obtain the best results unless he has the sympathy and co-operation of the local directors. Each director should take an active interest in the meetings which are to be held in his immediate vicinity. If he does not receive advertising material, posters and hand bills, within two or three weeks previous to the meeting or meetings, he should make application to the secretary for the same. It is advised, also, that the local directors co-operate with the secretary in planning for discussions to immediately follow the addresses announced.

The local secretary and the superintendent are always glad to receive criticisms, suggestions or recommendations regarding Institute work. We must depend upon the good judgment and advice of practical farmers as a guide in carrying on the work efficiently. It is to be hoped that an effort will be made to secure local farmers, or others interested in Institute work, to give addresses and papers at both afternoon and evening sessions, when time will permit of the same.

It is to be hoped that many more local Farmers' Institute Clubs will be established throughout the Province during the coming winter. These organizations have proved most beneficial in many localities and should be established in all sections, if the greatest good is to result from Institute work. By holding meetings for the purpose of discussing local conditions, and studying the various reports, bulletins and agricultural papers received by the members from time to time, one or two evenings in the month can be spent with pleasure and profit to all concerned. It is the intention of the Department to encourage the establishment of these Clubs, and definite announcements regarding them will be made at a later date.

We trust that Institute officers will not neglect to enlist the assistance and co-operation of business and professional men. The up-to-date business man and the wide-awake professional man are impressed with the importance of the agricultural advancement of the community, and, if rightly approached, there should be little difficulty in securing their co-operation in the work.

It must be borne in mind that the work of the Institute is purely agricultural, and only those topics which can be classed under this heading are expected to receive the attention of the Institute. The rule governing this is given herewith:—"Long speeches, or those calculated to advertise the property of the speaker, are contrary to the rules governing Institutes. Party politics in any form must be avoided by each speaker. The chairman of each delegation and the officers of each Institute are expected to see that nothing of this kind occurs."

The delegates sent out are, for the most part, men who are actively engaged in agriculture. While no special conference for speakers is being arranged for this year, many of the speakers will be in attendance at the Experimental Union and the Winter Fair in December, and will at that time receive many valuable suggestions and much information which will help them in their Institute work. Illustrated material, such as charts, drawings, etc., will be furnished to the delegates, and every assistance will be rendered to make their work thoroughly practical and efficient.

Both delegates and officers are requested to familiarize themselves with the "Rules and Regulations governing Farmers' Institutes." Copies can be had upon application to the Superintendent.

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KEY TO MEETINGS TO BE ATTENDED BY SPEAKERS FROM NOVEMBER 29TH, 1907, TO MARCH 7TH, 1908.

The key given below indicates the page upon which announcements regarding the speaker named, may be found. Several of the persons named under "Speakers and Subjects" are not in a position this year to attend any Institute meetings, while others will be available for only a portion of the season. Institute officers who wish to secure definite information regarding the services of speakers for additional meetings, may do so by applying to the Superintendent.

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	Vice-President	Wm. Hendrick	Beachburg.
	Sec.-Treas.	John Brown	Beachburg.
Renfrew, South	President	D. Muirhead	Renfrew.
	Vice-President	David Barr, Sr.	Renfrew.
	Sec.-Treas.	G. MacIntyre	Renfrew.
Russell	President	Hon. W. C. Edwards	Rockland.
	1st Vice-President	Daniel McDonald	Russell.
	2nd Vice-President	N. F. Wilson, M.P.	Cumberland.
	Sec.-Treas.	W. R. Summerby	Russell.
Simcoe, Centre	President	R. Graham	Saurin.
	Vice-President	John Anderson	Crossland.
	Sec.-Treas.	Wm. Pratt	Penetanguishene.
Simcoe, East	President	J. S. Nelson	Price's Corners.
	Vice-President	John Wiggins	Guthrie.
	Sec.-Treas.	R. C. Hipwell	Orillia.
Simcoe, South	President	Jno. Simple	Tottenham.
	Vice-President	Jas. A. Kidd	Cookstown.
	Sec.-Treas.	W. J. W. Lennox	Newton Robinson.

OFFICERS FOR 1907-8.—*Concluded.*

Institute.		*Name.*	*P.O. Address.*
Simcoe, West	President	J. A. McDermid	Stayner.
(Officers for 1906)	Vice-President	Jno. Smith	Duntroon.
	Sec.-Treas.	Jno. McKee	Duntroon.
St. Joseph Island	President	J. G. Reesor	Carterton.
	Vice-President	Wm. Dunn	Marksville.
	Sec.-Treas.	C. A. Young	Richard's Landing.
Stormont	President	Leslie Foster	Newington.
	Vice-President	Donald N. Mclean	Berwick.
	Sec.-Treas.	D. H. McDiarmid	Avonmore.
Temiscamingue District	President		
	Vice-President		
	Sec.-Treas.	R. Parker	Uno Park.
Victoria, East	President	W. H. Cullis	Powles' Corners.
	Vice-President	Isaac Fee	Mt. Pleasant.
	Sec.-Treas.	Wm. Thurston	Bobcaygeon.
Victoria, West	President	Wm. Channon	Oakwood.
	Vice-President	Donald Jackson	Woodville.
	Sec.-Treas.	Jas. Keith	Lindsay.
Waterloo, North	President	A. B. Snyder	Elmira.
	1st Vice-President	A. Doering	Crosshill.
	2nd Vice-President	Josiah Stauffer	Waterloo.
	Sec.-Treas.	Allen Shantz	Waterloo.
Waterloo, South	President	W. C. Shaw	Hespeler.
	1st Vice-President	S. S. Horner	Mannheim.
	2nd Vice-President	Walter Oliver	Branchton.
	Sec.-Treas.	W. Slater	Galt.
	Assistant Secretary	C. D. Brown	Haysville.
Welland	President	Wallace Tufts	Welland Station.
	Vice-President	A. G. Scilly	Air Line Junction.
	Sec.-Treas.	W. H. Gainer	Welland.
Wellington, Centre	President	J. A. Henderson	Dracon.
	Vice-President	Thos. Dearing	Orton.
	Sec.-Treas.	Geo. Wright	Elora.
Wellington, East	President	Alfred Hutchison	Mt. Forest.
	Vice-President	J. P. Beer	Arthur.
	Sec.-Treas.	Chester Nicholson	Mt. Forest.
Wellington, South	President	John Barber	Guelph.
	1st Vice-President	Wm. Scott	Eramosa.
	2nd Vice-President	J. A. Cockburn	Aberfoyle.
	Sec.-Treas.	G. B. Hood	Guelph.
Wellington, West	President	F. J. Short	Moorefields.
	Vice-President	J. F. Philip	Rothsay.
	Sec.-Treas.	S. M. Clemens	Drayton.
Union	President	Alex. Drummond	Clifford.
	Vice-President	John Pritchard	Redgrave.
	Sec.-Treas.	David Campbell	Clifford.
Wentworth, North	President	G. N. Harris	Lynden.
	1st Vice-President	J. A. Gray	Freelton.
	2nd Vice-President	Wm. Drummond	Waterdown.
	Sec.-Treas.	Alfred Purnell	Puslinch.
Wentworth, South	President	J. H. McNeilly	Stoney Creek.
	Vice-President		
	Sec.-Treas.	Erland Lee	Stoney Creek.
York, East	President	Geo. Robins	Malvern.
	Vice-President	Geo. Robinson	Markham.
	Sec.-Treas.	A. J. Reynolds	Scarboro Junction.
York, North	President	Archie McCallum	King City.
	Vice-President	Simeon Lemon	Kettleby.
	Sec.-Treas.	F. W. Heacock	Aurora.
York, West	President	Lockie Cameron	Nashville.
	Vice-President	A. E. Mercer	Burnhamthorpe.
	Sec.-Treas.	Robt. L. Crawford	Emery.

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